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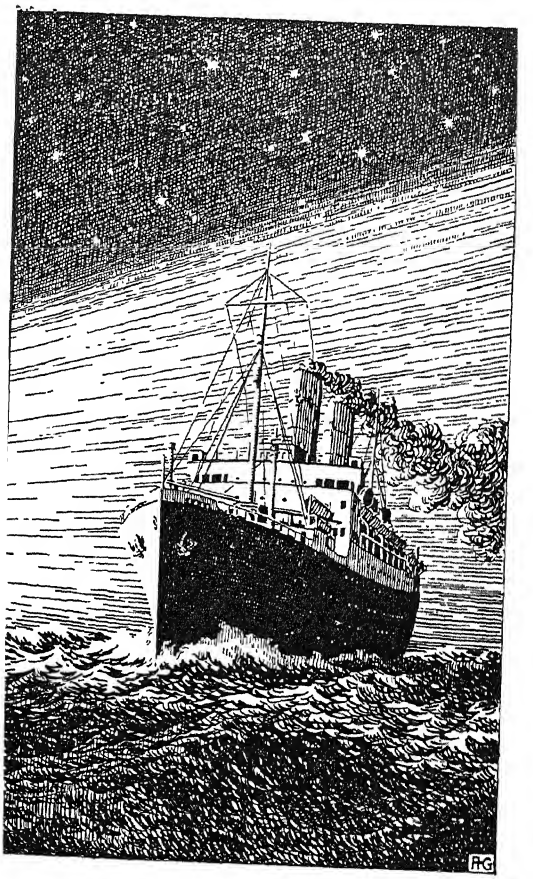

"Tory Island To-night"
Canadian Pacific entering the first beam of Europe.

SHIPSHAPE

OR

SEA-LEGS WITHOUT TEARS

by

EDMUND VALE

Drawings by

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& RUTH VALE

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to whom the author is indebted

for the idea of this book

FOREWORD

SAILORS must bear with the author of this book. It is written for landsmen by a landsman. Yachtsmen may shake their heads. They are a privileged and an initiated class, more intolerant of the un-nautical than sailors themselves. Between the silent sailor and the technical yachtsman, where will the landsman learn simple things, if the voice of the lubber is not heard in his midst? May he not be sent to the cook to demand for the captain the key of the kelson? and be received by the cook with the remark that no such key could possibly be forthcoming, but that the price of asking such a silly question is drinks to the power of *x*. Hereinafter, that old lady and that clergyman, who perennially crop up in anecdotes of *what the Captain is asked*, may find out beforehand respectively, that the ship is not tied up to a tree for the night, and that the Captain does not live in the Gulf of St. Lawrence, and therefore cannot be expected to know whether it is always foggy there or not. So, if only because he fends off the too-querulous and too-curious passenger, perhaps sailors will, after all, bear with the author for the impertinence of writing a land-lubber's book about the sea.

But we may well pause a moment and ask frankly, who is the sailor of to-day and who the land-lubber?

The requirements of a master mariner of yesterday were endurance first, and next, knowledge of the following subjects, the wind, the water, how to navigate a ship, how to drive a ship. You couldn't learn all these things in any other but a sailing-ship, but if you did not know them, you were not fit, according to the seaman of the old school, to go on the bridge of a steamer, and could never be called a real sailor. Now sailing-ships have gone; and of all the old qualifications only one is necessary, to be able to navigate a ship. Whatever the wind or the water happen to be doing makes very little difference—if you are nervous, the wireless weather-prophet will see you through. Someone else drives the ship for you; there is a machine for sounding, and a direction-finder. As to endurance, this quality is now necessary only in the steward's department. It is becoming as difficult to get a breath of fresh air on the bridge, as it is in a modern motor car.

The sad truth is, that with the advance of comfort and safety, the landsman with his all-shore ideas is getting control at sea, and the time may not be far off, when the chief engineer will be able to rise a step higher and write "Master Mariner" after his name. In the meantime two fates seem to be open to our cherished heritage. Either it will be recklessly cast away, and the "Floating Hotel" and "Floating Town" ideal will be realized successfully, or we shall cling to the sea tradition till the perfect voyage shall be evolved.

FOREWORD

The perfect voyage might perhaps be adequately described as public yachting without swank. Life at sea should be the antithesis of life ashore. Only by accepting this principle can the curing restfulness and the stimulating majesty of the sea be felt.

The yachtsman is admittedly a fair-weather sailor, but he knows how to extract from the sea every ounce of romance and enjoyment that it can offer. His enthusiasm for nautical gear and nautical objects, from a cat-head to a lighthouse, is the outcome of knowledge and of those strange sympathies awakened by keenness, which knit men to things. To a sea-lover the sight of a steamer dropping down the river on the tide, wearing her pilot flag and ensign, and with the Blue Peter fluttering down from her mast-head, is a vision inexpressible. If one could get at the facts, it is her gear that fascinates him. It is the gear, the make-up, and the set of it, which stirs him, because he knows the language of it. And it is the author's feeling that many voyagers want a short cut to the names and meanings of ships' parts, and a guide to sea objects which break the horizon. The day of the perfect voyage will hardly dawn till every one understands these things. So though he is neither a sailor nor a yachtsman, he ventures to play the part of showman.

E. V.

NANT FFRANCON PASS,
November 1930.

The author gratefully acknowledges the assistance and facilities afforded him by ships' officers and the shipping companies while he was preparing this book. He is particularly indebted to the Canadian Pacific for help and kindness, and to Messrs. Cammell Laird the ship-builders. He is indebted to the Admiralty Light Lists for the detail in the identification tables of lighthouses, though the graphic method of using circles and lines for quick reference is, so far as he is aware, new.

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CHAPTER I

SHIPS

SEA "atmosphere" is even stronger than sea air and has the same inviolable constancy. In spite of the levelling influences of engineering and science, the old element retains all its glamour. But its pleasures are immensely enhanced, for to-day the risk of shipwreck is more negligible than the risk of accident to a land vehicle. Neptune and the Sirens are indeed heavily shackled, but the glamour, the mystery, the great magnetic charm of deep waters remain. It must be something more than salt air and scenic effect that touches man so nearly and so deeply. The sea is the oldest thing in the world and the most unchanged. If we had lived in the times of the coal-forest, or seen with the eyes of the ichthyosaurus, or with the more rudimentary optics of an infinitely earlier generation of creatures, we should have beheld two things in common with the twentieth century—the stars and the sea.

The sea is unchanged, but not so our attitude towards it. It was always the glory of poets and adventurers; but as a source of pleasure to the ordinary man in the street it was unknown. Less than a hundred

years ago, the wrecks round the coast of Great Britain ran into thousands annually. By storm, by fog, by uncharted rocks, by professional wreckers, the toll was taken, so that our fathers feared the sea to the point of anguish; and to be a sea tourist it was necessary to be of the stuff explorers are made of. Even this intrepid individual—the sea tourist—would probably be too much preoccupied with discomfort, danger, and a turned stomach, to take a keen interest in anything short of the approach of the sea-serpent or the Jolly Roger. But now one can tread the decks in safety, drink iced lager in the tropics, and eat mangoes in the fjords of Norway, and there is plenty of time to look round and take an interest in everything.

A ship is the embodiment of simplicity, the acme of economy in building and in management. With the possible exception of the ice-breaker, she is amenable to a definition of one word which will be true of her in all respects both of art and science. She is a *vehicle.* The fairy skiff of Arthurian legend, the Ship of Death, the tramp steamer, touch the imagination at the same point—they carry. So does a wheelbarrow, a motor car, an aeroplane. Yet these latter are things which, although they may touch the imagination, do not captivate it. An express railway train, and a trek wagon, come nearer the mark, and the reason is not far to seek. It is the carrying of a community of human beings over great distances that casts the spell; and if those distances are beset with

solitude, and that solitude is primeval, the spell is complete.

The history of shipping falls under two heads, the power-ship and the sailing-ship. It is perhaps a little astonishing to find that though the sailing-ship has had the distinction of carrying Sindbad and wrecking St. Paul and Robinson Crusoe, and of civilizing and linking up the whole world through exploration, it has yet played a very small part in the annals of flotation compared with the power-ship. The Phœnicians, Egyptians, Greeks, and Romans carried most of their merchandise and fought all their battles in ships driven with oars. They had their *Majestics* and their *Aquitanias*. Such was Ptolomy's galley of forty banks with its four rudders and oars counterbalanced inboard with huge lead weights.

The Vikings used sail as an auxiliary to power and thereby discovered America. But it was in oar-power that they trusted, and it was with oar-power that King Alfred beat them. Economy and not necessity was the mother of the sailing-ship. Soldiers drove the war-galleys, slaves the merchant ships, and when in France, for example, the former were scarce and the latter unprocurable, it was criminals and Protestants that were made to toil at the oar under slave conditions.

Sail did not come into vogue, except in England, until long sea passages became general. Even the great wind-jammers of the Spanish Armada were accompanied by a modicum of power-driven ships. The sailing-ship did not fully come into her own until

after the American War of Independence, when it was discovered that America could build faster and better ships than England; then the race to perfection began. Trade boomed, masts grew taller, more and more sail was clapped on, till men saw the most perfect thing that they had ever made, racing up Channel, with stunsails set, and with bright bunting jewelling the tops of dazzling towers of canvas, manned by a race of Homeric heroes, the clipper-ship—the glorious *vehicle* carrying tea from China! It is one of the strangest stories of the sea, how the sailing-ship grew suddenly to perfected womanhood and vanished like a translated saint.

We are once more in the age of power-ships. But the power is mechanical and not human, and it has brought with it a new class of ship unknown a hundred years ago—the liner, a ship which sails to the moment and arrives to the moment, and carries a horde of light-hearted passengers who never think of shipwreck and hardly of sea-sickness.

Only three different means have been found to propel ships of any size through the water; the paddle-wheel, the screw, and the jet—that is pumping the water in through the bow and out at the stern and *sucking* the ship along. The paddle-wheel came first. To begin with, it was simply a water-wheel with fixed paddles which wasted energy by exerting a force downwards when entering the water and upwards when leaving it, and did a certain amount of work between the two positions. This was succeeded by the in-

vention of the feathering paddle, which kept all the floats in a vertical plane as the wheel turned, and thus exerted a propelling movement forwards or backwards so long as it turned in the water.

Marine steam engines fall into two classes—*reciprocating* and *turbine*. The reciprocator is a piston engine working up and down and turning a crank; the turbine is an endlessly glorified windmill in a box which blows round and round from the friction of steam forced against its blades. The evolution of the reciprocating engine is a curious story of a cycle of positions. First it worked standing on its head with the piston-rod thrusting upwards. Then it lay down and worked in the horizontal plane. The most ingenious mechanism was designed to make it turn a propeller-shaft in this position and at the same time fit athwart-ships into the narrow space imposed by the beam of the vessel. Finally it was made to work with its head in the air, and the crank below the cross-head.

The story of the first steamers is more curious than that of the first locomotives, particularly when one compares the date of these enterprises with the history of the world. In 1787, on the eve of the outburst of the French Revolution, a Scotch laird of an inventive turn of mind, by name Patrick Millar, was engaged on trying to produce a power-ship which could improve on the now obsolete galley and work independently of the wind with a greater economy of man-power. His experiments took the form of double-hulled vessels with paddle-wheels fixed between the

hulls and two rudders steered from one wheel. The power was human and was derived from capstans worked on the decks. The paddle-wheels could be lifted from the water when sail was hoisted. One of these vessels was 255 tons burden, and was made to muscle along at the surprising speed of 4·3 knots, with thirty men toiling at the capstans. She was presented by the inventor to the King of Sweden, and made the voyage under her own muscle-power. Imagine the state of mind of a crew compelled to walk round and round on a heaving deck, while their vessel makes a bare four knots, all across the North Sea! It was lucky for Millar's peace of mind that the ship was never destined to return from Sweden. It happened that the tutor of the laird's son knew a man at Wanlockhead — that wild out-of-the-way mining village which boasts the loneliest situation and the highest house in Scotland—who was making a contrivance to work by steam. His name was Symington; the laird summoned him to Dalswinton.

After this visit, manned capstans were discarded, and Symington's steam-engine was installed. A double-hulled vessel was used. The engine was placed on the deck of one hull, the boiler on the other, and the paddle-wheels between the two. This boat was made to go at five miles an hour on Dalswinton Loch. Robert Burns made a special expedition to see the wonder, and took a trip across the lake on her. James Watt's steam-engine was by this time patented, and he was in partnership with Boulton,

a prosperous iron-master of Birmingham. Millar tried to get Watt and Boulton to join in the enterprise of promoting steam navigation, but they refused. He applied to the British Admiralty, which sickened at the thought of smoke and oil, and shooed the inventors away. Millar, who seems to have had a double-hull complex and thought more of this than steam, now dropped both Symington and his steamer.

It was over twelve years before the inventor was taken up again, this time by Lord Dundas. A new steamer was built, the *Charlotte Dundas*, and in 1802 a trial was made with her on the Forth and Clyde Canal. She was set to pull a loaded barge. The test was amazingly successful, but hidden hands of vested interests pulled strings and worked puppet mouthpieces, and the canal authorities proclaimed that the wash from the paddle-wheel would ruin the banks. So *Charlotte Dundas* and Symington were dropped again. *Charlotte* was laid-up by the canal bank to rot, and it does not seem to have occurred to either the inventor, his patron, or the unjust judges, to try her on any other piece of water. The brother-in-law of Lord Dundas was First Lord of the Admiralty, and probably an attempt to force the wooden walls of Old England by steam was made again. But of course nothing came of it, and three years after the *Charlotte* was laid-by Trafalgar was fought.

In the seventeen-eighties two steamers had actually been built in America by the inventors Rumsey and Fitch. Robert Fulton of Pennsylvania had seen

Fitch's masterpiece in action on the Delaware when he was a boy. He came to England with inventions which were not kindly received. Then he went to France with inventions, both of a submarine and a torpedo, which he tried to get Napoleon to take up for the destruction of England's sea-power. Being unsuccessful he returned to England, with his head full of steam, and ordered an engine for his projected *Clermont* from Messrs. Boulton and Watt of Birmingham, thus ensuring the blessing of the business world. The *Clermont* plied in America and was a commercial success. She ran her trials on the Hudson in 1807.

Henry Bell was not an inventor but an energetic optimist. He was the proprietor of the baths at Hellensburgh on the Clyde. In 1800 (two years before the trials of *Charlotte Dundas*) Mr. Bell had bought a boiler and some kind of stationary engine. His funds would not run to a boat, so he borrowed one. We are just given to understand that the contraption "went," and hints are greater than figures to all good optimists. That foolhardy man then tackled the Admiralty. The matter came up for discussion. Opposition issued as a matter of course from all mouths save one, that of Lord Nelson, who is quoted as having said: "My Lords and Gentlemen, if you do not adopt Mr. Bell's scheme other nations will, and in the end vex every vein of this Empire." At last in 1812 Bell managed to "bring out" the *Comet*. The boiler was made by Napier, the engine

by Robertson. An ex-schoolmaster commanded her and on her pay-list was a piper. Inimitable Clydeside!

When Napoleon Bonaparte had been carried off to St. Helena and war on sea and land seemed over for ever, the British Admiralty was again assailed by none other than the engineer Rennie. Rennie had done so much for the Admiralty in the way of building docks and harbours that they were at least bound to listen to him and return a polite answer. Their lordships replied disgustedly that "it was a smoky innovation, and if permitted, would only render ships liable to the constant risk of being blown up by boiler explosions." But this time Lord Melville, that brother-in-law of Lord Dundas, who was still at Whitehall, secured permission for Rennie to give a demonstration. The experiment was so successful that the naval experts were reduced to merely cavilling at the size of the paddle-boxes. In the end they ordered one steam tug—Messrs. Boulton and Watt, of course.

Paddle-steamers, besides being the delight of children, have done great service and achieved great successes. Until a year or two before the war Messrs. John Burns's paddle-steamer *Adder* crossed daily from Ardrossan to Belfast with passengers and the mail, and her speed was twenty knots. She was probably the finest paddle-steamer ever built, though the Isle of Man Steam Packet Company must have run her close with their fleet of side-wheelers.

The screw propeller was not a later invention than

the paddle. Setting aside the responsibility of Archimedes in the matter, the idea that power-ships could be driven through the water as well with a screw as a paddle-wheel was apparent to the earliest builders of steamers, but for some reason the screw suffered from prejudice. It was, of course, more difficult for the earlier engines to turn a shaft along the axis of the vessel rather than at right angles to it. But there was more in it than that. The screw was under a cloud. It suffered from one of those curious "anti's" that will dominate even a faculty of learned men with the tyranny of a fashion in dress. Shameful professional taboo! It should be a historical reminder that business is as prone to this witchcraft as society. But in 1839 Brunel grasped the advantages of the screw so forcibly that after he had designed the *Great Britain* for paddles he had her converted to screw propulsion when her construction was already well in hand. The *Great Britain* was the first screw steamer to cross the Atlantic. She had a six-bladed propeller which broke and was replaced by a four-bladed one. In 1846 she stranded on the Irish coast, and propaddleites raised their hands in glee and said, "Of course!" Nevertheless, she was refloated and kept the high seas till 1882 when she retired to the Falkland Islands, where she is still afloat as a coal-hulk.

In 1845 the Admiralty settled the matter of propulsion to their own satisfaction in martial style by tying a screw- and a paddle-steamer of equal size tail to tail and ordering them both to go full-speed ahead

—screw-steamer *Rattler* won the tug-of-war. And yet as late as 1851 the *Encyclopædia Britannica* marked its disapproval by ignoring any mention of the abhorred screw principle in connection with shipping.

The majority of people have taken the high artistic qualities of sailing-ships for granted. They have literally swallowed them after St. Paul's quaint formula, asking no questions "for conscience sake." Had they consulted their consciences they would have had to admit that they knew very little of the matter except that sailing-ships looked very nice in picture galleries and ploughing a furrow on the blue sea itself. Indeed it was a thing that had to be taken on trust, for the proof of the sailing-ship's qualities lay with the sailor alone, and the sailor has proved the matter conclusively by showing that his devotion to his ship was greater than any man's devotion to anything except a woman and a prince. Alone of all inanimate objects in our language a ship is by usage entitled to the feminine gender. And this important distinction has been handed on without demur to the steamer and the motor vessel. The sailor-man is not exactly an art-critic, but in his heart he knows what beauty is as well as, if not better than, the professing expert in such matters. And he, the inarticulate mariner, in the teeth of lexicographers, grammarians, lawyers, technicists, and the Board of Trade, has prevailed in claiming feminity for his ship, and thereby in perfect metaphor has endowed her with the highest æsthetic ideal conceivable.

It will be argued that, having once got the feminine gender of a ship established in the language, it would be automatically perpetuated for all ships irrespective of merit. This may turn out to be true in the end, but the writer submits that it has not come to pass yet. And it may be argued that the sailor no longer works his ship—for engineers do it—and that peculiar and singular identity called sailorliness, which he used to impose on the whole fabric, as seen in knots and splices, and lashings, and ropes coiled down, and sails bent, etc., he can impose no longer; and that the engineers, who have it really all their own way now, will never learn these things. But the fact is that both sailors and engineers are only slaves. It is the sea which imposes itself on every ship that sails or steams or motors. And the sea decrees that a ship must be the embodiment of simplicity, the acme of economy in building, and in management. Improvements, amenities, and first-class passengers have all to fall into line with this axiom, and the ship that can keep the sea can keep her feminine gender.

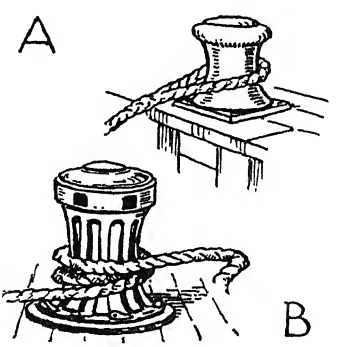
Turbine engines have many advantages but they have not the charm or glory of reciprocators. In general the reciprocating engine is either *compound* or *triple-expansion*—high-sounding names yet easy to understand. The compound engine consists of two cylinders, of which the smaller is called the high-pressure cylinder and receives its steam direct from the boiler. The steam in this cylinder makes elbow-room for itself by forcing the piston down. But

before it is fully expanded it is let out into another much larger cylinder with an increased area of piston on which to operate. Here it makes the remainder of its elbow-room before being let out into the condenser to be shrivelled back into water, and so cause that useful bit of vacuum which helps the engines a little more by suction. The triple-expansion engine works the same way, except that instead of two it has three cylinders of different areas—the high, intermediate, and low-pressure cylinders—through which the steam must work out its elbow-room before reaching the condenser.

Now the ordinary marine engine of all nations in all seas is the triple-expansion. And this engine has been the delight and the pride of those Scottish chiefs whose clans comprise engineers, firemen, donkey-men, and trimmers. There is nothing petty, mean, or insignificant about a triple-expansion engine, no matter what the hull or top-hamper of the ship it is driving may look like. It is the embodiment of integrity and reliability. And that Scottish chief and his staff will stand on the iron floor of the engine-room hours by hours watching it, listening to its bowling, momentous rhythm, feeling the moving parts tenderly from time to time. Never a Scotchman signed on as a marine engineer who was not fascinated by that engine. It reflects the best characteristics of his own countrymen. It is his idea of God. The whole ship from the forecastle-head to taffrail is permeated with its rhythm; the shrouds

vibrate to it; it reaches to the masthead. Like the waves of the sea it goes on and says the same thing for ever, and its devotees are never tired of listening to it. In those velvet tropic nights when the ship is alone with the stars and the lifting horizon, the pang of loneliness is lifted into poetry by just two things, the occasional sharp rustle of the bow-wave and the continual lilt of the triple-expansion engine.

But Rudyard Kipling has hit it all off to perfection in "McAndrews' Hymn."



A. BOLLARD—For mooring
B. CAPSTAN—For heaving.

CHAPTER II

THE PARTS OF A SHIP

Above Board

A steamer, looking towards the direction in which she is proceeding, has fixed names for her left and right sides. They are respectively *port* and *starboard*. These terms apply equally well to a sailing-ship, but on board that craft they are not the terms commonly used. The names for the sides of a sailing-ship and for the sides of her sails depend on the way the wind is blowing, and the terms port and starboard are not in general use except in harbour or when the wind refuses to blow. With them, the side towards the wind is called the *weather* side—*weather bow*, *weather beam*, *weather quarter*. The sheltered side is called the *leeward* side (pronounced "looard"—the *lee bow*, *lee beam*, *lee quarter*. Likewise there is no fixed name for the side of a square sail, the weather side being called the *luff*, and the lee edge the *leech*.

Then, taking the topography of a ship into consideration it must be borne in mind that she has always maintained the analogy of a small world. And the analogy is so strong and simple and so tacitly understood, that it has constantly been reimported from the

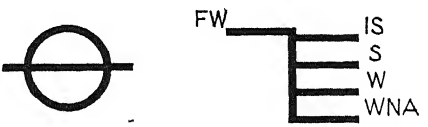
sea to present graphically the separateness of any community who regard themselves as occupying a world of their own. Thus we have "the Ship of State." The Medieval Church considered itself the Ship of Salvation, and the word *nave* is derived from that very analogy. Amiens Cathedral steers a course laid as from its spiritual haven at Jerusalem, and the builders have designedly placed the prophets outside the western front. There they stand under the richly carved prow, peering into the future, a company of gifted pilots. This analogy again goes back to sea, so that in older ships the break of the poop was the counterpart of the chancel-steps, as the chancel-steps had been earlier the counterpart of the break of the poop—the helm region of the Ark of God. The symbol had become both inextricable and interchangeable, and over both was actually set up the holy rood, the memory of which the sailors of the Royal Navy still honour by saluting the quarter-deck.

The Church has drawn its symbolism from the sea and ships and fishermen since the days of Galilee. And the separate-world feeling, in which man braves chaos in company, is strong in both. Also the feeling of boundaries, parts, and relative positions. The poles of a ship are called the *bow* and the *stern*, and the position of anything situated sternwards of the bow is described as being *aft* of that point, or *abaft* it, while anything bow-wards of the stern is described as being *forward* (pronounced "forrard") of it, or simply *before* it. The bow-piece reaching from the deck, down-

wards, is called the *stem*, while in the stern there is a corresponding *stern-post*. The two extremities are connected beneath the ship's bottom by a *keel*. The region where the stem meets the keel, is called the *fore-foot*.

The outer shell of the hull is called the *skin*, and now that ships are built double right up to the water-line, the two husks are known as the inner and the outer skin. The greatest breadth measurement of a ship is called her *beam*. The name also denotes the midships zone which, situated a little to each side of the beam, divides the *fore-part* from the *after-part* of the ship. The term is used in the following manner. Observations of land-falls, ships, and lights are described as appearing in relation to the ship as "right ahead," "on the port (or starboard) bow," "on the port (or starboard) beam," "on the port (or starboard) quarter," and "right aft." *On* the bow, etc. refers to something outside the ship. *In* the bows refers to something on the ship. The wooden beams of old days have been replaced by angle-irons. But they bear the same name. On the main beam, or near it, the ship bears her identity mark—her official number and the number denoting her registered tonnage. This is one of the four marks that every British ship must bear by law. In the absence of a main beam the particulars are generally to be found stamped on a hatch-combing. The remaining marks are the *load-line*, the *depth-marks*, and her own name and address. The load-line, called also the *Plimsoll line*, is a white

circle divided by a line parallel to the water-line painted on the side of the ship. Below this horizontal mark the ship must not be allowed to go to sea out of any home port. Certain marks made alongside the line allow a variety of changes in the load according to the season of the year and the kind of water the ship floats in.



The letters stand for the following. F W: maximum loading depth in fresh water. A ship loaded to this depth will rise to the S line (the same level as the line through the circle) when she gets into salt water. I S stands for Indian Summer. It indicates the depth allowed in the fine season between Suez and Singapore. W: stands for Winter—1 October till the end of March—between the Mediterranean and European ports. W N A: Winter North Atlantic, i.e. the Western Ocean passage. Samuel Plimsoll was an Englishman who devoted his whole life and energies to getting his load-line Bill through the British Parliament. It has proved an effective cure for the rapacity of shipowners and merchants and the horrible practice of "coffin" ships. Most nations have now fallen into line and have adopted the Plimsoll mark. The depth-marks are painted on the stem and show the *draft* in feet in Roman figures. And it is compulsory that the name should be painted on either side of the bow,

and on the stern, together with the port that she hails from. Fishing vessels which are under different restrictions are compelled, like motor cars, to carry registration numbers with letters indicating their home port painted large on the mainsail.

The *keel* of a ship has become through the forces of evolution a vestigial ridge. Whereas it was a dorsal fin and spinal column in one, it is now little more than the spinal column with structural, rather than sailing, functions; but it is still the absolute foundation of every ship. In a ship carrying canvas a deep keel was necessary to stop her blowing to one side and *making leeway*. But in a steamer this is not necessary, so both the deep keel and those comely fish-like lines, the pride of the ship-builder and the delight of the artist, are given up. The modern steamer, large or small, is a flat-bottomed craft with her keel a mere ridge. In wooden ships the planks immediately adjacent to the keel were called the *garboard strakes*, and the term is still retained to denote the plates which in iron ships occupy the same position. The "corner" of the hull where the bottom turns upwards and becomes the side is called the *bilge*. The word is the same as bulge and survives in the anatomy of a cask whose protuberant waist is still called its bilge. If any doubt remains as to the exact position of the bilge, it may be defined as that portion of the hull on which the vessel rests when she is left high and dry on the mud. To reduce the rolling of a steamer, a lesser

keel is generally fixed along the curve of the bilge, called a *bilge-keel.*

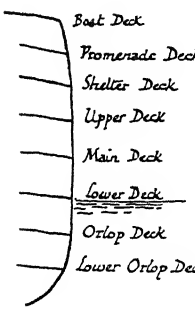
Although the outward form of the steamer's hull is very different from that of its grandparent the sailing-ship, the interior shows its descent very clearly. The ribs of the wooden ship have become the *frames* of the iron ship; that is, the iron ship which is built on the system of transverse frames—and this covers the majority. There is another system of building, generally dated from the nineteenth century, and called the Isherwood, or longitudinal system. Actually it is one whose lineage may be more ancient than plank and rib, for skin coracles were, and still are, built that way. But the Isherwood system is only in use for special types of vessels, such as oil-tankers, so we need not dwell on it. One famous exception to the rule may be mentioned in passing, namely the *Great Eastern*, which was built on the longitudinal plan. The ribs, then, have become frames. These are braced under the decks by girders which still retain the name of their wooden forefathers—beams. And the angle-piece which effects the joint between frame and beam also keeps its good old name—*knee.*

The interior of the hull is divided, horizontally by decks, and vertically by *bulkheads.* A bulkhead means any kind of partition where ashore we should use the word wall. But it is now getting to have the more special sense of a water-tight partition. To minimize the risk of sinking, a modern ship is built with a double bottom and often with an inner

shell which extends across the bottom and up the sides to the height of the water-line. This large vacant space is used for storing fuel oil and fresh water, and water-ballast to compensate for the weight of cargo when the ship is sailing unfreighted—hence the term for a ship going light, "she is proceeding *in ballast*." The inner skin wards chiefly against grounding on a sand-bank or grazing on a reef. But for surviving the greater danger of collision, the ship is divided into several compartments which can be rendered water-tight in a matter of seconds, and thus leave the ship buoyant, when one or more have been flooded. The bulkheads of these compartments are stout, pressure-resisting partitions pierced by doors of a special design, which close by a powerful mechanical agency at the will of the officer on watch upon the bridge. The closing device is generally hydraulic. There is an electric tell-tale on the bridge showing by means of small lamps which doors are closed and which open.

Since the introduction of steam and the addition of floor upon floor for the accommodation of passengers, the sailor has attempted to keep pace with the naming of his decks until the matter has been forcibly taken out of his hands, by the unromantic longshoreman who has named them alphabetically. You now begin at the top with your A deck, and work downwards. It is a pity that this has happened, as the names of the decks have a good sea sound, and it is surely one of the most obstinate of fallacies to

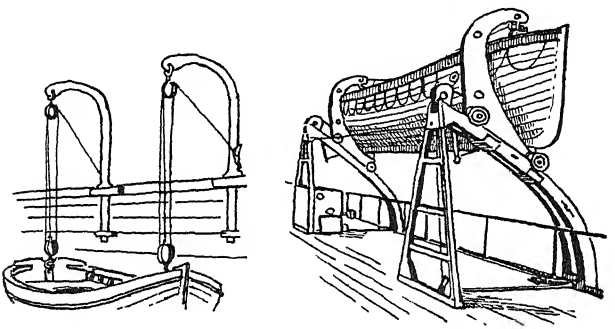
suppose that people who go a voyage do not like to associate themselves with the atmosphere of things nautical, but prefer to imagine themselves as cooped in the most egregious of all shore institutions—an hotel. That it is still possible to have decks after the time-honoured fashion is shown in the accompanying sketch of a section of the *Mauretania*.



Since ships have lost their sails they have grown in bulk and top-sides till their uppermost deck almost out-tops the mast of the tall ship of old days. And the masts, once the levers of the ship's driving power, have turned into a queer combination of lamp-post and telegraph-pole. With the coming of motor-power, funnels have shrunk suddenly, and this shrinkage has left the eye gazing amazedly, as if for the first time, at the immensity of upper works and the cluttering up of space by life-boats.

The small boats which a ship carries on her weather decks, as a means of escape for crew and passengers in case of accident, are known as *life-boats*, and the hoist-like mechanisms for clearing and lowering the boats out-board are called *davits*, the *a* being pronounced as in David. The old-fashioned davit, as used in sailing-ships and perpetuated in steamers, was an object of artistic merit. But after the wreck of the *Titanic*, when so many mishaps

occurred in launching the boats, the old fitting was hastily cast aside for objects of the engineer's conception, which looked extremely unsightly and marred the trim look of the boat-deck. Now, however, the sea has asserted itself again, and a davit with the appearance of the old and the efficiency of the new



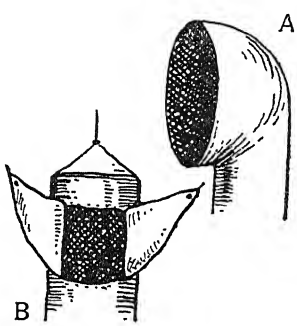
DAVITS

Old Pattern. Welin-McLaughlin type.

is available. The Welin-McLaughlin davit has the added advantage that passengers can get a clear view under the boats and also gain extra space for deck games.

Next to the funnels and the boats, the deck fittings which make a steamer look steamerish are the *ventilator cowls*, whose huge trumpet heads, if well shaped, help to give her a look of dash and power. Nothing makes the cargo steamer seem so cloddish and lacking in that look of breed which distinguishes the passenger-carrier, as her ventilators, if they are thin and leggy. The function of cowls is to supply air to living

quarters, holds, etc. They rotate at their bases, and can be set to face any direction. Some of them have electric fans fitted in them to induce or expel the necessary draught. The ventilator of the sailing-ship was made of canvas and called a *wind-sail*. It is still found useful on steamers as a spare ventilator, for it can be easily stowed when not in use.



VENTILATORS
A. Cowl. B. Wind-sail

I have likened the mast of a modern steamer to a combination of lamp-post and telegraph-pole, by which I mean that but for two things which have nothing to do with the sailing-ship, this ornament, which seemed inseparable from ships since the world began, would have gone the way of oar and canvas. But the Board of Trade compels a ship to carry a mast-head light and the requirements of wireless telegraphy involve a second mast at least, to keep the aerial stretched. All steamship masts are made of iron, and if in one piece from heel to truck they are called *pole* masts. The wooden masts of sailing-ships were compound, and consisted generally of three parts, each called a mast—*lower mast*, *top-mast*, and *top-gallant mast*. In a three-masted ship the masts are called respectively the *fore*, the *main*, and the *mizzen*. The handsome spars that crossed the masts and carried sails have gone,

together with the complicated rigging that worked them, called the *running* gear. But the *standing rigging* that holds the masts up remains very much as before. It consists of stays running fore and aft called *fore-stays* and *back-stays*, and others called *shrouds* fixed to the sides of the ship and running to some point high up on the mast. This last word dates back from the time when shroud was used for any garment, and not confined to grave-clothes. It belongs to the sailor's scheme of personifying woman in his ship.

The spars of the square rig have gone. But the *boom* of the fore-and-aft rig has been saved through a new need arising, as in the case of the masts. Booms have not only remained, they have thriven and multiplied. They have become crane-arms for loading and unloading cargoes. They are called *derricks*, a shore name carried to sea at the end of Queen Elizabeth's reign and retained in absolute purity both of spelling and analogy, for they commemorate Derrick, a once-famous hangman.

The anchor is no longer hove up on a stout hempen rope round a capstan, but on a heavy chain round a steam winch. The chain is still called the *cable*, and the pipe through which it runs out is still called the *hawse-pipe*. Formerly, the anchor had to be fished up on to the fore-deck, but nowadays it is made without the *stock*, that familiar crossbar essential to the cap-badge, the inn sign, and the emblem of hope. The "patent" stockless anchor has its arms pivoted on to the shank through the crown, and it is

hove right up into the hawse-pipe, where it remains ready to let go at a moment's notice. All ships have two anchors in the bows, called *bower* anchors. The largest steamers have three, one running through a hawse-pipe in the stem. A spare anchor is lashed ready to hand. In the navy, but not in the merchant service, this stand-by is called the *sheet*-anchor. Some ships are fitted specially to anchor by the stern as well, so that they shall not swing in a tide-way. Any anchor put out from the stern is called a *stream*-anchor.

Below Deck

A ship is divided internally as follows: cargo space, passenger accommodation, engine and boiler space, officers' quarters, engineers' quarters, crew's quarters, stewards' quarters. In British ships the law does not allow passengers to be carried on more than one deck below the load water-line. In old days they were generally accommodated aft, but now since they have become more fastidious they demand to be put amidships. The midships position is desirable for two reasons. First, because the movement of the ship when she is pitching is less felt there than in any other part. Secondly, because at the extremities the vibration of the machinery is most perceptible; and when the ship is pitching the depth of water covering the propellers varies, and they often thrash out in the air. This makes the engines race momentarily,

shaking the after part of the vessel and often causing considerable discomfort to passengers located in that region.

The first-class passenger gets the midships zone. He also gets the best deck-space. And these two things are more important on a long voyage than any luxury of internal fittings. The position of the second-class passenger varies with different ships. But the third-class passenger must almost inevitably expect to find himself over the propeller, hence *steerage*.

Cabins fall into four categories, outside cabins, Bibby cabins, inside cabins, and deck cabins. The advantage of an outside cabin on or above the main deck is that you have a port-hole which can be opened, and as a port-hole is one of the few really nautical fitments that passengers are still allowed to enjoy there is a natural fascination in it beyond its mere uses of letting in light and air. Outside cabins on decks below the main deck have also got port-holes, but the joys of them are seriously mitigated by the fact that they generally have to be kept shut in case water should find its way in. Roughly speaking, the *main deck* is identical with the floor of the first-class dining-room.

A Bibby cabin is an inside cabin planned so that a little passage runs from it between two outside cabins to the skin of the ship and a port-hole. The name is derived from the Bibby Line who introduced the innovation, so that it might be said that every cabin on the ship had a port-hole. An inside cabin proper

has no port-hole and therefore can never be lit except by artificial light. It does not at all follow that such a cabin is stuffy, as the ventilation on modern ships is so efficient that foul air gets very little chance of lodging anywhere. And a compensation to some people for the loss of the port-hole will be found in the fact that the more inboard you lie the less rolling you feel. A deck cabin has the advantage that you can nearly always leave your port-hole or window open, and the disadvantage that your outlook is not directly on the sea and therefore curtains have to be drawn. The fact that a piece of deck intervenes between oneself, the freeboard, and the ocean gives one that distressful villa feeling of being overlooked. There is nothing to beat the outside cabin on the main deck where you can open your port-hole and put your head out and feel yourself at sea, even in a liner.

That phrase *even in a liner* calls for a qualification. Agreed that one does not get the seafaring pleasures of a voyage so well on a liner as one does on a small cargo steamer where there are no other passengers and one is in close touch with the ship, the sea, and the seaman who is all sailor of the strongest, briniest sort. Still, it is a base aspersion on the mystery of the sea to call any ship, no matter how big or how well fitted up, a "floating hotel." There is no parallel at all between a ship and an hotel. Though luxury and even gaudiness may be lavished on her, the rigid limitations imposed on the ship under the one awful ward *seaworthiness* allow of no real frills. It will be

found in consequence that even in point of fittings and furnishings, a ship is always in better taste than the best hotel. Your table-steward too is not a man of straw like your waiter. He cannot throw down his napkin and vanish in a huff. There is something more than a *maître d'hôtel* behind him, something more than a chief steward—there is a grave uncompromising captain of a ship, and there is the sea. Behind everything is the sea, and there is no outdazzling that imminent danger in the background. All the world afloat is subconsciously alive to that pervading peril, that circumambient sufferance. All the ship's company is keyed up under this discipline to a sustained alertness and a keener and livelier sense of their humanity in a manner impossible even to the best drilled hotel staff. Again, an exceptional house may have an individuality, but every ship from a fisherman's coble upwards has an individuality and more—a personality. Can one take pride in one's hotel?—But to be proud of one's ship is a bond of chivalry with the pride of angels.

For all this, the tendency is to ape the shore and replace time-honoured and well-loved names of sea association by commonplace domestic words. You must now call your berth your bed, and your cabin your bedroom. The companion has become the staircase, and the galley is the kitchen. A passage is still called an *alleyway*, and this almost negative part of a ship which has received no honour in sea literature or drama remains little altered and retains

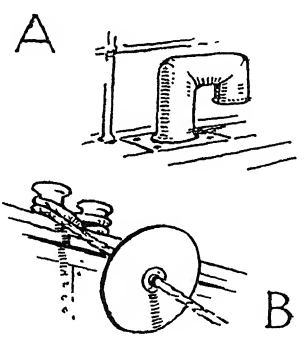
the full ship flavour. A sight of the inevitable *storm-rail* running along it on either hand is sufficient to break the hotel dream and keep humble the proudest stomach.

Modern ship-building in its rapid evolution since the days of the wooden walls has produced a new man with a new mystery. He is the piping man. The amazing thing about him is that he is not merely saturated with lore and skill in the matter of pipes but has been born with a *feeling* for them. He is as rare a product of natural genius as a tea-taster, and as necessary to his peculiar profession. An X-ray photograph of a large ship which showed the piping only would surprise most people. Leaving out the electrical fittings, whose piped circuits are complicated enough, one finds steam pipes to all parts of the ship, hot and cold fresh-water pipes, hot and cold sea-water pipes, suction pipes, oil circulating pipes, drain-pipes, ventilating trunks, refrigeration pipes, and finally pipes from every hold and compartment concentrating on a glass box on the bridge for the purpose of detecting fire on board, by delivering a puff of smoke from the locality of the outbreak into that glass box.

All things considered, from the passenger's point of view, the greatest amenity developed in sea travel in this century has been ventilation. Here the Thermotank punkah-louvre system leads, and marks a step forward that the public seems hardly as yet to have realized. By this means a stream of fresh air at any desired

temperature is sent all over the ship, into every room and every cabin. The smells and stuffiness of passengers' quarters in old ships (for which no suitable adjectives have ever been invented) were only tolerated because they were thought to be one of the necessary evils of the sea.

The punkah-louvre is a ball-like spout working on a universal joint. By moving it the air-stream can be directed anywhere the passenger wishes or by a closing movement the supply can be cut off altogether. The invention is a greater godsend than any new turn of speed or upholsterer's eye-service.



A. GOOSE-NECK—A common deck object situated in or near the scuppers. It admits air to the ballast tanks.

B. RAT-GUARD—Used in dock to prevent rats coming on board.

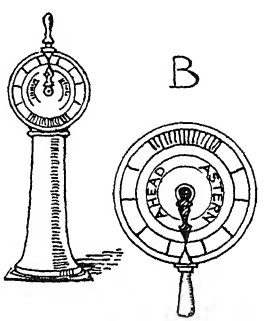
CHAPTER III

THE BRIDGE

THE bridge is the Holy of holies of a ship. It is the seat of her brain, eyes, ears, and that subtle instinct of pathfinding which leads her through fog and darkness over the unmarked wilderness of water to her destination. The privileged passenger who is invited by the captain to visit this small aloof deck-space must be struck by two things, contrasting elements, which mark it out as a place apart from the rest of the ship. One is a sublime calmness and serenity, and the other is the restrained activity of alertness. These feelings are heightened by the massive appearance of the bridge fittings and instruments, with their seaman-like cut, the smooth polish of glass and brass, and the curt orders, reduced to written form and printed out in bold black letters, on the telegraph dials, like so many crystallized hails.

On a moderate-sized steamer, the fixed bridge instruments are not many. The first and last to be used on a voyage is the engine-room *telegraph*. The word must not be confused with the electric Morse instruments used ashore for sending telegrams, though when it was first used at sea the usual method of sending messages by arms and disks from point to point

was still in vogue ashore, and from the idea of a visual telegram it took its name. The ship's telegraph is a pillar, surmounted by a drum whose heads are ground-glass dials, illuminated from within at night. The dials are quartered in two main divisions—ahead and astern—and nine subdivisions, indicating speeds in both directions, full, half, slow, and stop, the cautioning command "stand by," and the dismiss signal "finished with engines." In a single-screw ship one lever on the drum operates the pointer on both dials.



SHIP'S TELEGRAPH
A. On bridge.
B. In engine-room.

In twin-screw ships there are two levers, independent of each other, which order respectively the workings of the port and starboard engines, the commands being read on separate dials in the engine-room. Thus one can generally tell by a glance at the telegraphs on the bridge whether a ship is single- or twin-screw. Supplementing the telegraph is a speaking-tube, and on more modern ships an electric telephone also. There is generally a telegraph to the poop bridge to communicate orders for the management of hawsers in making fast and casting off. And there is usually a steering telegraph between the bridge and the after wheel-house.

The engine-room telegraph has its artistic appeal,

It cuts a principal figure in the romantic make-up of a steamer, and takes the place of the old ringing thrill of word, to make and to shorten sail, in no unworthy degree. If the captain were to set a great vessel in motion and send her to sea by an insignificant movement of some little niggling electric switch, the matter would be otherwise. But the telegraph is no toy. It is operated with a bold swinging movement that causes a loud duplex gong to peal imperiously in the engine-room with an unmistakable noise of authority. Each order is checked back—as is in general customary at sea—by a tell-tale pointer on the dial of the telegraph on the bridge, to the tune of a mild tinkle, as submissive in tone as the down-going order was haughty.

Having started the engines, the most important thing on the bridge is the combination set of steering-wheel and *binnacle* sometimes made in one instrument but generally in two. Sailing-ships were steered by a wheel on the poop which acted directly on the rudder head, while the force of the seas reacted on the men who handled it. This force was often great enough to spin two men away at once, like marbles from a teetotum. A small steamer can be steered by hand, but a large one must be steered by power, and steam is the agent generally adopted, though in motor vessels it is electricity. The small engine that works the steam steering-gear is sometimes placed high up in the engine-room casing, but more often it is in a wheel-house at the stern of the ship, over the rudder-head.

The engine is driven and reversed by the small steering-wheel on the bridge, the connection being effected by pressure on a piped circuit of oil and glycerine.

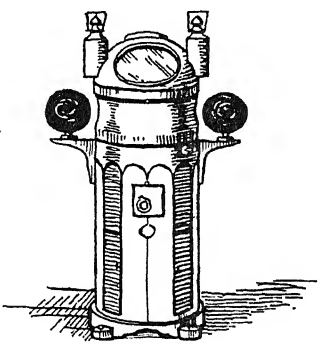
The binnacle is the shrine wherein dwells the ship's instinct, the compass. As a shrine, a good binnacle looks the part to perfection. At night, though the whole ship is lit up, the bridge and the wheel-house are in darkness, except for the light that shines through the little window in the brazen dome of the binnacle. The gaze of the man at the wheel is fixed through this window on a black vertical line (called the *lubber-line*) which represents the head of the ship. In front, and almost in contact with it, swims the compass card, always maintaining its level (by means of pivoted hoops or *gimbals*) whatever the motion of the ship. The point of the compass on which the course is laid is kept against the lubber-line, and as the ship's head falls off this side, or that, the helmsman spins his wheel and brings his point back to the lubber-line. There is also an indicator showing the man how much helm either to port or starboard he has given the ship, and there is generally a tell-tale also showing whether or not the rudder is obeying the wheel properly.

The helm answers the same direction to that in which the wheel is turned. But with the ancient tiller, of course, the movements are opposed. If you put your tiller to port, your ship went to starboard. Nevertheless, it is the tiller rule which obtains universally at sea to-day. If the officer of the watch wants his ship to go hard a-port, he sings out, "Hard

a-starboard!" on which the steersman spins his wheel to port as far as it will go, and the ship's head follows the wheel. There have been innumerable attempts to get rid of this curiously tortuous proceeding in which a wrong order is intentionally given and systematically disobeyed. But the old procedure has always triumphed, as nobody has ever liked to risk a misunderstanding in the face of the sudden danger of collision. When it is remembered that merchant ships pay off at the end of each voyage or "round trip," and the man in charge of the situation can never be sure of what may be rooted in the mind of his subordinate except the standing tradition of the sea, this persistence of an anomaly is not surprising. But a new attempt has been made, and instead of the old plea of "port for port, and starboard for starboard," the Shipping Conference of 1928 decided in desperation to oust sea terms altogether, and to make the helm orders henceforth simply "Left" and "Right." It remains to be seen whether this root-and-branch measure will meet with better success than those of the past.

The ordinary binnacle enshrines the magnetic compass, and all that pertains to it, whereas the gyro-binnacle is only a very small part of a complicated machine. What pertains to a magnetic compass beyond the card itself are the magnets and masses of iron which hedge the instrument about, to neutralize forces other than the earth's attraction, which would otherwise make the compass give a false reading. Outside the earth's natural

magnetism, there are two forces more or less constant, which tend to draw the compass needles from the line of truth; one is a horizontal force, and the other a vertical force, and both are present from the same cause, namely the iron of which the ship is built. The "harder" the iron the more it retains magnetism after it has had its molecules disturbed by hammering. If you go into a shipyard and enter the hull of a vessel on the ways, during work hours, the noise of hammering is more than deafening, it is positively painful to the untried ear. This same hammering is having the effect of turning the ship herself into a permanent magnet. If she is built lying north and south she will be a huge magnet along the line of her keel. If she lies east and west she will be an array of lesser magnets along the lines of her beams. And this magnetism will stick to her, and only be gradually modified by the hammering of the seas. To correct this and also the vertical magnetism, two large round iron balls are placed on either side the compass, generally on the outside of the binnacle, and there is a large tube of soft iron rods (the *Flinders bar*) in the vertical plane, while the little cupboards in the binnacle have extra bar magnets



BINNACLE

placed in them by the shore expert who attends to this matter.

Magnetic compasses are of three kinds, the ordinary spirit compass, the *dry-card* compass, and the *dead-beat* compass. The first has its card immersed in spirit for the purpose of damping out the swinging oscillations of the two needles that move the card. The second was introduced by Lord Kelvin. It moves in air instead of spirit, and has six short magnets suspended beneath the card. The short magnets and low centre of gravity tend to damp out oscillation. The third is a spirit compass with a rim instead of a whole card, and this has the filaments of metal fastened below it to act as dampers in the fluid. This compass has the advantage of a minimum of oscillation.

The magnetic compass, though still in almost universal use both on the water and in the air, has actually been superseded by the gyrostatic compass. This instrument, on account of its weight and cost of purchase, is only in use on the largest vessels. But its superiority over the old mariner's compass is so manifest that it is almost bound eventually to replace the older instrument in all craft of moderate size. The gyro-compass, to give it its more popular and no doubt ultimate name, is based on a totally different principle to its magnetic rival. The principle is that if a heavy fly-wheel mounted on a spindle rotates fast enough, it will, if unchecked by any hindrance, set itself so that its spindle is parallel to the earth's axis. This means that one end of the spindle will

point to the true North Pole and the other end to the South Pole.

A gyro-compass is made by three different firms in three separate countries. The German instrument is the Anschutz, the American is the Sperry (used with British modifications in the British navy). The British compass is the Brown. It is a point of interest that Mr. S. G. Brown was a pupil of Lord Kelvin and related to him by marriage. It was Lord Kelvin who perfected the magnetic compass.

The gyro-binnacle of the Brown compass is not placed on the bridge, like the mariner's compass, but is situated in a little dark room somewhere in the middle of the ship. All its movements are reflected accurately on subsidiary instruments, each with its familiar compass card, called repeaters. One is on the bridge, one in the wireless cabin (for use in conjunction with the direction-finder), and there may be as many others distributed about the ship as desired, each telling the same tale at the same second. The Sperry gyro-binnacle is located on the bridge.

The chief points in favour of the gyro-compass above the magnetic one are three. It points to the true North instead of to the magnetic pole, and there is no *variation*—the technical name for the local difference between the true and magnetic North. It is not influenced by the inherent but varying magnetism of the ship or *deviation*, as it is called, to which the mariner's compass is susceptible. It keeps its place with so much more steadiness than the magnetic instrument

that courses can be steered straighter, and mileage can thus be saved. The third point is that it can be made to work an automatic helm—"iron man" and "metal mike" are sailors' names for it—which will steer the ship on a given course without human intervention. But in the present state of the invention this iron man is a doubtful boon. He is said to lack the quality of mercy, and to keep the power steering-gear so hard at work, touching off the rudder this way and that, in his remorseless robot rectitude, that he is apt to tire out even engines. One day, when he is humanized a little more, the iron man will come into his own.

Every ship carries two *logs*, which resemble each other just as little as either of them resembles the section of a felled tree. The first is the journal in which everything relating to the ship, her voyages, and the weather she encounters on them, is entered up—also the names of defaulting seamen. In early days when writing on vellum was a serious undertaking, a number of short boards hinged together at their ends, so as to fold front to front and back to back, was used. The daily entries were made on these wooden leaves with chalk, largely hieroglyphical no doubt. In those days when clerks were monks, and went to no other offices but those of religion, and there was no accommodation for rubbish "filed for reference," the captain probably swabbed off the last voyage at the beginning of the next.

The other log is an instrument whereby the speed of a ship is gauged, and also the distance she travels.

It is an instrument like a small clock, and is actuated by a propeller at the end of a long line trailing out into the sea. Generally it is to be found perched on the after-rail, ringing its puny bell in forlorn solitude while it presides over titanic demonstrations of marine horse-power and oceanic violence. Its progenitor was a solid log, pitched into the sea from the bows and allowed to float past while the speed mariner gave tongue to a prepared rigmarole. When the log reached the stern, the mariner stopped his repetition, and by the number of words he had uttered it was known roughly in English miles per hour at what speed the ship was travelling. Those logs were rough and ready, and agreed well with the sailors who used them. When there was no Greenwich Observatory, no Nautical Almanac, and no Admiralty Charts, you had to be very rough indeed, and very ready indeed, to face the ravening seas.

By *dead reckoning* is meant guessing the ship's position on the chart without the aid of astronomical observations. It is a reckoning compounded of a knowledge of two factors in deep water, and three factors in shallow—the ship's course from the last definitely ascertained point, the distance she had travelled from it, and the depth of water and contours of the sea-floor over which she is sailing. Before the invention of the patent log with propeller and dial, there was no way of telling the distance the ship had travelled if the sky was unfavourable for a sight of sun or stars.

For gauging the speed of a vessel the ancient method of the heaved log was improved on by a device known as the *log-ship*, which is still in use in sailing-ships. This method gives us the name for the unit of speed, the *knot*. A piece of wood cut in the shape of a quadrant and weighted on the round edge —the log-ship—is attached by a bridle to the log-line. A sand-glass is provided, which has a time-ratio proportionate to the length of line between a white rag attached to the log-line and a piece of leather fastened farther along — the knot, in fact. Now, one knot is equivalent to a nautical mile per hour. And a nautical mile is a sixtieth of a degree of latitude— one minute. But owing to the fact that the earth is not a perfect sphere, the polar latitude varies slightly from the equatorial latitude. So for purposes of measuring speed, the British Admiralty has fixed a measured nautical mile of 6080 feet, which is the distance adopted in computing knots. Therefore if your sand-glass runs out at 14 seconds, the length of line between the white rag and the leather knot will be 23 feet 7 inches. Other marks and knots are made along the line at this interval. It takes three men to heave the hand log-line. One of the mates drops the log-ship with slack line over the side, while a man holds the measuring-glass with the empty bulb up, and another holds the reel with the line wound on it. The log-ship holds the water like a sea-anchor, and remains fixed while the line pays out after the ship. As soon as the white rag goes by, the mate

sings out "Turn!" on which the man with the sand-glass up-ends it. As soon as the sand has run out, the timer calls "Stop!" The line is at once stopped, and by the number of marks and knots which have run out in the 14 seconds, the speed of the ship is ascertained.

The patent log gives, at a glance on the dial, the speed of the ship in knots, and the distance she has travelled. It is not always fixed aft. It is becoming prevalent to rig it to a boom, projecting from the bridge. In the latter case, by an attachment, it can be made to give a reading in the chart-room as well as on the boom-end.

An additional guide to speed is the *tachometer*, which records the number of revolutions made by the propeller-shaft per minute. On modern ships, tachometers are generally fixed on the bridge as well as in the engine-room.

The next thing of prime importance to the navigator, is sounding-gear. In old days, sounding was always done by a hand line—in shallow water with a 7-pound lead, in deep water with a 28-pound lead. The ship had to be stopped for each sounding, and in deep-sea work the mere hauling up of the line, hand-over-hand, was no mean undertaking. To-day, soundings at all depths can be taken when the ship is doing twenty knots. The first sounding-machine was invented by that pioneer in navigation instruments, Lord Kelvin. The lead is dropped from the end of a boom swung outboard to clear the propeller, and operated

by a multiplying winding-gear which can be worked by hand, or with an electric motor. The line is made of wire, on the principle of piano wire, instead of hemp —for sounding the deep C, as Lord Kelvin put it. Above the lead plummet is fixed a metal case containing a glass tube. In the tube, which is two feet long and open at the bottom, is a preparation of chromate of silver, which is red in colour. The pressure varying proportionately with the depth forces the sea-water into the tube and turns the red chemical white. Naturally with the speed of the ship the line trails some way astern. But it is the depth, and not the length of line, that tells the tale, and immediately bottom is found there is a jolt on the line, the running-drum is stopped, and the machine set to wind in. The tube is taken out, and the length of the white line set against a scale gives the depth in fathoms. There is a spring device on the market which takes the place of the chemical tube. It works in the opposite way to a spring balance. Pressure acts on a piston which sets a pointer on a scale in the instrument, and the depth can be read off at once, and another sounding taken without having to replace a part, as in the case of the other.

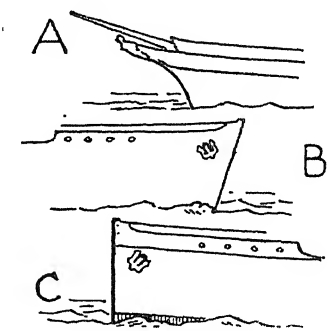
But even these methods are clumsy and laborious when compared to the latest invention, that of the echo-sounder. The echo-sounder is at present only fitted on the largest ships. But it is an invention which is bound to have a far-reaching influence on navigation, and one which will presently take its place

among the few indispensable instruments of the bridge. At present it is chiefly used—as most sounding-machines are—for ascertaining depths in shallow water within the 100-fathom line. But when, by its application, charts of great depths are prepared, with the sea-floor contours as closely figured as those of shoal waters, the echo-sounder will be used for position-finding on sunless days.

The principle is as follows. A sound-wave is propagated under water by a hydrophone. The sound is reflected back from the sea-floor and is picked up by a receiver. Sound under water travels at the rate of 4935 feet per second. Therefore if the time between the emission and reception of the sound can be accurately ascertained in fractions of a second, the distance of the whole path of the sound can be deduced, and the depth will, of course, be a half of that path.

By ingenious devices the essential calculation has been made automatic. The echo-sounder is really the offspring of the hydrophone, an invention developed by the British navy during the war to ascertain, by the under-water noise of her propellers, the distance off of an enemy submarine. This novel range-finder having been perfected, the achievement of the echo-sounder was only one step farther. There are several patterns on the market. The one which is in use by the Royal navy, the father of all of them, is made by Messrs. Henry Hughes. Its automatic calculator consists of two rotary switches revolving at a uniform speed per second. One of these switches actuates the

hydrophone circuit, the other the receiving circuit. The brush contacts of the latter can be adjusted by a turn-knob so as to increase or lessen the interval between the switch which operates the hydrophone and its companion which listens for the echo. Briefly, then, when the echo is heard in the earphones the pointer attached to the turn-knob will have worked out the sum on the dial-scale.



TYPES OF BOW

A. Clipper bow.
B. Raked bow (a hull colliding with this bow will be holed *above* the water-line).
C. Straight stem.

CHAPTER IV

THE ENGINE-ROOM

THE engine-room is a hall of trophies, trophies of mastery over the elementals, fire and water, trophies of speed and power won against wind and weather; diverse shapes and forms organized into a unity that is an inkling of perfection. And it has the sea-going stamp as undeniably as any other part of the ship. Nevertheless the engineer does not make a mystery of his mechanisms. In fact he is always at the greatest pains to explain everything away, without condescension, and with inexhaustible forbearance, to any visitor who gains admittance to his highly complicated underworld. Not only this, but he is ready to listen to any controversial or even opposite point of view a passenger may choose to offer. A cathedral verger has everything to learn from him. His accessibility is ideally democratic.

For generations it has been recognized that the seaman was a highly specialized individual. He has had to live alone with Nature in vast, inhospitable horizons and has had to turn every vagary of her uncontrolled forces to one specific end, the furtherance of the voyage. He has developed sharp sight and intuitions. The engineer is becoming specialized along

the lines of sharp hearing, indeed one might call it *second* hearing. The heroism of the engine-room is of a negative kind. It consists of unwearying alertness to maintain the monotonous. Its reward is obscurity. Who cares anything about the works so long as the ship goes?

In the old-fashioned engine-room, where everything could be seen, and all the important working parts could be tested for overheating by touch of the expert hand—sight, touch, and hearing all stood the watches out on about equal terms. But in the turbine-room of to-day none of the working parts except the propeller-shaft can either be seen or felt. They can only be heard. And the marine engineer's sense of hearing has become correspondingly acute. To the stranger's ear the turbo-orchestra seems to produce a sound at once deafening and confusing. To the trained ear it is always in tune so long as things are going right. The least suspicion of a false note and the alarm-bell rings for the chief engineer. Likely enough he heard it in his sleep and is already on the way down.

All marine engines fall into two main groups. They are either reciprocating or rotary. A reciprocating engine is one whose original impulse is an up-and-down motion. This is converted into a round-and round motion by means of a crank. All old-fashioned marine engines are of this type as explained in Chapter I. Steam reciprocating engines are still being fitted in ships where only a moderate speed is wanted. The

oil-driven engine of the motor vessel also belongs to this group. The rotary engine family is chiefly represented by the turbine and the electric motor.

In a steamship, the engine-room is in three departments, the *stoke-hold*, the *main engines*, the *electric plant*. The last has developed so much of recent years since deck-machinery has been electrified that it generally has an engine-room to itself. The reason for this is that electric power is used on deck a great deal more than it used to be, capstans and winches that had their own little steam-engines are now electrified, and up-to-date systems of ventilation require powerful electromotors to work them.

Since the war, King Coal has almost been ousted from the sea by crude oil, and the stoke-hold has been improved out of recognition. It is a drawing-room compared to what it used to be, when an army of half-nude men, covered with sweat and plastered with coal-dust, toiled unceasingly with an endless clatter of shovels. Oil has many advantages over coal. It is easy to bunker, it involves little labour, and is perfectly clean. Trimming the ship when she is ballasted with this fuel is infinitely simpler. The labour of firing is naturally reduced enormously. But what appeals most to the engineer is the fact that with oil fuel he can control his steam uniformly, and to a nicety unknown with coal.

In a stoke-hold there are two systems of draught, *induced* and *forced*. The former, which is used by most merchant ships, depends on the natural

draught up the funnel assisted by fans. With forced draught, fans are relied on entirely, and the stoke-hold atmosphere is kept at a pressure slightly higher than that of the outside air. This means that it has to be cut off from the engine-room by two doors with a space in between, which allows one door to be shut before the other is opened. Or the engine-room can be included, so long as double doors shut it off from the rest of the ship.

On going your round of the stoke-hold you should observe the types of boiler. There are two, called *fire-tube* and *water-tube*. The former (generally known as the Scotch boiler) contains water in loose bulk, and the fire is led through from end to end in tubes. In the water-tube the process is reversed. The fire is, so to speak, loose and the water is led through it in a number of small tubes. The water-tube boiler is generally employed in high-speed ships. The *donkey-boiler* is a boiler in which steam is kept up for running deck-machinery when the ship is in port and the other boilers are resting or being scaled—it does the donkey-work.

In going the round of the steamer's main engine-room, if you would not lose your head among the multiplicity of wagging gauges, wheel-valves, pipes, and what not, you should hang on to three skeleton outlines of what is going on. We might call them the cycle of power, the cycle of lubrication, and the work. The incidents in the cycle of power are: (1) boiler-pumps; (2) boilers; (3) valve-gear; (4) engines; (5) condensers. After which the water goes the round again.

The cycle of lubrication is best explained on the spot. By the *work* I mean everything between the first shaft coupling and the propeller; and that includes the thrust-block. Altogether, then, there are eight particular points to look out for. The gauges can be sorted out into four kinds: water (in boiler), steam (at all stages), vacuum (in condenser), and lubrication oil.

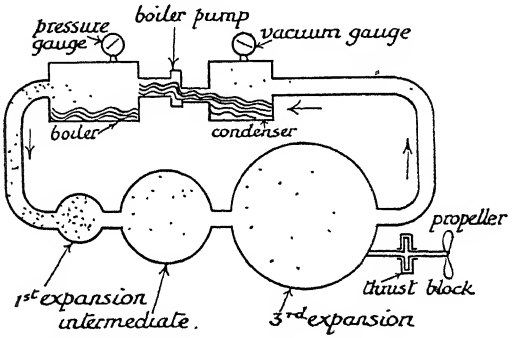


DIAGRAM TO ILLUSTRATE THE CYCLE OF POWER

To go into a little more detail, the boiler-pumps force water into the boilers against the pressure of the steam. Old-fashioned ones made their presence known by a peculiar sickening knock at intervals. The modern one gives a long musical diminuendo whine. Steam passes from the boilers to the engines through the valve-gear which is controlled from the starting-platform. By the starting platform are the telegraph dials on which the commands from the bridge are signalled. The commands as they come through are checked back on to the bridge instrument and recorded on a blackboard in a kind of shorthand, with the

time at which they were received. The engines, whether reciprocating or turbine, are generally arranged to work in a series of expansions. But this has been explained in Chapter I. When the steam has done its last ounce of work it passes into a *surface condenser*. This consists of honeycombs of tubes, to accommodate the steam, which are kept cool by a torrent of cold sea-water incessantly circulated round them. The steam is thence transferred to the *hot-well* by the *air-pump*. And from the hot-well it renews its circuit, being absorbed by the boiler feed-pumps as required.

The outrush of the circulating salt-water from the ship is called the *main-discharge*. It is a feature the marine-painter rightly sets store by as it adds a peculiar liveliness to the look of a ship. In ships with reciprocating engines the air-pumps and the circulating-pumps which work the cataract of the main discharge go up and down with the cross-heads of the engines, giving a pulsing impetus to the out-flow which looks even more lively, and is the only way of telling from outside whether the ship is a reciprocator or a turbine. The condenser serves a second important function in addition to turning the steam back to water. The act of condensation produces a vacuum, which, if perfect, will show 30 inches on the gauge. Thus, while steam pressure is applied at one end of the engines, suction is applied at the other, discharging the steam quickly and increasing the efficiency of the engine in terms of pounds per square inch.

Turbines differ from reciprocating engines as radi-

cally in the steam principle as they do in the movement principle. A piston and cylinder engine is worked by *pressure* only. In the turbine it is steam velocity that counts, called more technically kinetic energy. Again, there are two kinds of turbine, called respectively the *impulse* and *reaction* turbine. A simple example of the former is a windmill or a water-wheel. The principle of the reaction turbine is seen in the lawn-sprinkler or the catherine-wheel firework. Here the active agent is inside the machine, instead of outside, and presses itself away against the air or something more stable in the shape of fixed vanes. One of the steam engines devised by Hero of Alexandria, a hundred and thirty years before Christ, was a simple reaction turbine. The modern steam turbine generally contains both principles.

The marine turbine has to revolve many times faster than the shaft it drives in order to maintain efficiency, as its principle is bound up with velocity. The link is effected by a huge *reduction gear.*

The next unit of importance to notice is the *thrust-block.* Imagine the propeller of a ship screwing its way through the water towards its destination. The captain orders his engines "Full speed astern!" Immediately the engines are reversed the propeller starts to screw its way backwards. At that moment, if it could, it would pull both itself, its shaft, and anything else it could carry away right out of the ship. Something must be contrived to ensure that the ship is pulled back with it. The old-fashioned thrust-block

was a long bearing with several vertical surfaces, against which worked as many collars attached to the shaft, and the friction was reduced as much as possible with ordinary lubricants. The adjustments to make all surfaces bear equally were frightful. This has been superseded by the Mitchell thrust-block. It has only a single collar. By means of certain small segmental pads it works in such a way that a film of oil is forced between the bearing surfaces and the metals never touch.

The long shafts now pass, coupling by coupling, down their respective tunnels till they enter their *stuffing-boxes* and vanish from sight under the stern. The last part of the shaft, to which the propeller is fixed is called the *tail-shaft*. All the way along the tunnels each shaft has been carried on ordinary bearings whose automatic lubrication can be readily inspected. Now, when the shaft passes from the air to the water there must be a final bearing and lubrication which will look after itself during the voyage. This problem greatly exercised the first designers of screw ships. John Penn solved it in 1854. He fell back on Nature's kindlier organic kingdom and used an all-wood bearing of lignum vitæ—the stuff bowls for bowling are made of. His system has never been bettered. The tail-shaft passes into the stern-tube, which has on the in-board end a stuffing-box, to stop water leaking into the ship, and thence into a packing of lignum vitæ which both supports the shaft, and whose nature in contact with water lubricates it.

There are a great many other things to see in the

engine-room, which the engineer will point out much better than I can. *Calorifiers* for instance—a real engineering name—merely signifying vessels for heating water by steam-pipes instead of fire. Your salt bath-water is cooked in them.

The engineer is celebrated for his optimism regarding the ship's position. He reckons up the turns of his propeller and has strong ideas on dead reckoning. He will nearly always give you a rosier forecast of the moment of arrival than you will get from the bridge. And the bridge never fails to twit him on his disregard of currents, tides, and winds. Anent this there is a story—a bridge story of course. A tramp steamer, S.S. *Puffin*, was coming out of the Mediterranean. She had fallen in with poor weather in the Gulf of Lyons, and her chief engineer had had some set-backs in his calculations as to the ship's daily position, based on his knowledge of the excellent behaviour of his engines. He was leaning moodily on the rail as they stood in under Gibraltar. The chief observed a string of signal flags run up ashore and wondered aloud what that message might be. The mate was standing beside him, looking through a pair of glasses. "Chief, that message would interest you," said he.

"What 's it all about, then?" asks the engineer.

The mate studies the flags another moment and then in a voice that may easily be heard above, on the bridge, replies: "The machinery of S.S. *Puffin* passed here two days ago, homeward bound."

CHAPTER V

TONNAGE AND TABLES

THE phrase tonnage covers many sorts of measurements at sea and is therefore often confusing to the uninitiated. The ton on which the gross and net tonnage of a ship is based is not a weight but a measure of cubic space called naïvely "a ton of measurement," and meaning actually 100 cubic feet of room. Both tons are derived from the same thing—a tun (the old word for barrel) of wine. Before we brewed beer at home we imported wine from abroad, and this and olive oil was probably the most familiar cargo, and required the same space in the hold to go back empty as it did to come full. No doubt it was early recognized as forming the most uniform basis for checking the capacity of a ship for purposes of levying dues. The ton weight came about similarly. Probably the "o" was substituted for the "u" in the word by some misguided spelling pedant of the same kidney as the man who introduced the unnecessary "h" into anchor. In this case, where we owed our word to the plain Latin, *ancora*, our learned stickler must pretend to divine a Homeric root for it with a Greek *chi* which did not, in fact, exist.

GROSS AND NET TONNAGE

There are three kinds of tonnage in shipping, gross and register tonnage, displacement tonnage, and Thames tonnage. Gross and register tonnage are bracketed together, as the system of measurement is the same. It is the system on which all ships of the merchant service are surveyed. But when war-ships are referred to, it is displacement tonnage that is meant. British *gross tonnage* is the cubic capacity of all *completely enclosed* spaces on a ship with certain exceptions, notably cookhouse, wheel-house, stern-steering house, and one or two other small items. The U.S.A. gross tonnage does not make these exceptions, and on this ground the Americans claim that the *Leviathan* is the largest ship in the world. *Register tonnage* is the gross tonnage after a great many more cuts have been made. It represents all the space on board which can be reckoned as earning space, that is space which is used for cargo and passengers, and which is going to make profits. It is therefore on this tonnage and not on gross tonnage that light and harbour dues are charged. The same is also called *net tonnage*. When mere tonnage, without the qualification of register or net, is mentioned it is always gross tonnage which is referred to, because this being the bigger figure it is naturally the one which shipping companies quote when they make mention of their ships in print. Net tonnage is misleading as giving figures for comparing one boat with another. For instance there are tug boats which, as they can be shown to have no enclosed cubic space that could

reasonably be called earning space, boast a net tonnage of nil.

Displacement tonnage is not "tons of measurement" but actual tons weight. It means the number of tons of water which a ship will dislodge merely by floating in the element. If you fill a tumbler of water to the brim and then put a heavy thimble to float in it, the thimble will spill so much water over the edge until it comes to rest in a floating state. If you were to collect all the water thus spilt and weigh it, it would be found equal to the weight of the thimble, and if you were to pour it into a mould, the same shape as the outside of the thimble, it would be seen that the water occupied exactly the same amount of space in the mould that the thimble occupied in the water. From this, two things may be gathered: (1) That the displacement tonnage of a ship is the same as the actual weight of the ship. (2) That if you had ascertained exactly whereabouts on the thimble the water would reach when it floated, you would have been able, by calculating the area of the thimble below that point, to have arrived at the weight of the thimble without putting it on the scales, supposing you knew how much, per cubic inch, water weighed. In fact it is necessary to displace thirty-five cubic feet of salt water before there is sufficient buoyancy to bear up one ton weight. But as I said, tons displacement is generally used only in connection with fighting ships.

Thames tonnage and rating refer to yachts and are mysteries too intricate to touch on here beyond mentioning that Thames tonnage is a matter of measurement and not weight.

The term *deadweight* refers to the carrying capacity of a ship. It is the difference between her tons displacement when she is riding light and when she is loaded. Her full deadweight capacity is therefore the number of tons she will carry without submerging the load-line.

In general, for comparing the size of ships, gross tonnage is the thing to have in one's mind. It soon becomes easy to tell at a glance, within the round figure of 1000, what the size of a ship is.

A further comparison of ships is based on the coefficient of fineness. What this means may be illustrated by picturing a model-maker about to cut out a model of the under-water form of a ship, that is the model of just so much of the ship as will be hidden from view when she is loaded down to the water-line. He takes an oblong piece of wood whose three dimensions will represent the length, breadth, and depth of the under-water form. He then proceeds to reduce its volume by cutting and paring till the hull is shaped. It is now a fraction of its original bulk though the three dimensions remain the same. This fraction, expressed as a decimal, is the coefficient of fineness. The coefficient of fineness multiplied by the three dimensions and divided by 35 will give the tons displacement of the hull.

THE BEAUFORT WIND SCALE

This was arranged by Admiral Sir Francis Beaufort (1774–1857) to fix definite values to the varying strengths of the wind.

Admiral Beaufort's Numbers	Velocity in Knots	Pressure in lbs. per sq. ft.	Seaman's Name for Wind	Deep-sea Criterion. The unit of comparison is a modern steel full-rigged ship with average coefficient of fineness, deep loaded, with a clean bottom	Coastal Criterion. The unit of comparison is a cutter- or yawl-rigged, average-sized sailing trawler, loaded, with a clean bottom
0	0	0	Calm		
1	1 to 3	·01 to ·04	Light air	Just sufficient to give steerage way	Sufficient to give good steerage way to fishing smacks
2	4 to 6	·05 to ·16	Light breeze	Ship with all sail full and by will make 2 knots	Fishing smacks with topsails and light canvas full and by will make up to 2 knots
3	7 to 10	·17 to ·44	Gentle breeze	Ship as above will make 3 to 4 knots	Smacks begin to heel. Will make up to 3 knots
4	11 to 16	·45 to ·96	Moderate breeze	Ship as above will make 5 to 6 knots	Good working breeze. Smacks heel over considerably

5	17 to 21	·97 to 1·75	Fresh breeze	Ship full and by can just carry royals and light stay-sails	Smacks shorten sail
6	22 to 27	1·76 to 2·88	Strong breeze	Ship as above can just carry topgallant sails	Smacks double-reef main-sails
7	28 to 33	2·89 to 4·43	Moderate gale or half a gale	Ship as above can just carry whole upper top-sails	Smacks remain in harbour and those at sea lie to
8	34 to 40	4·44 to 6·45	Fresh gale	Ship as above can just carry reefed upper top-sails and whole foresails	Smacks take shelter
9	41 to 47	6·46 to 9·00	Strong gale	Ship full and by can just carry lower topsails and reefed foresail	
10	48 to 55	9·01 to 12·16	Heavy gale or whole gale	Ship as above can just carry main lower top-sail	
11	56 to 65	12·17 to 15·97	Storm	Ship can only carry storm stay-sail or try-sail	
12	Above 65	15·98 and above	Hurricane	No canvas can stand	

like so many terms in the nautical vocabulary, the words are often interchangeable. Thus a yachtsman's burgee, denoting the club he belongs to, is a pointed flag, and the commodore's broad pennant is swallow-tailed.

Flags were probably a land invention, though the old Norse sagas tell of pennants and standards carried by Viking ships. In the days of chivalry the designing of flags, and rules governing their use, came naturally into the province of the Heralds' College, which was in fact responsible for that familiar creation, the Union Jack. The stars, stripes, and eagle of the United States of America probably have a heraldic origin also—the three emblems coincide with those of the old Washington crest and coat of arms. The Royal Standard is the personal flag of the Sovereign; other members of the royal family have their own standards. The word is otherwise used ashore chiefly to denote the banners of cavalry regiments, while the infantry are content with the less pretentious but more romantic word *colours*. House-flags belong entirely to the sea. They are really the private standards of shipping firms, each displaying the badge or particular colours of the owner.

The three British ensigns, white, blue, and red, are relics of the days, when the fleet was divided into three squadrons of colour. The admiral himself, in the red squadron, flew the red ensign at the maintop: the vice-admiral in the van, with his white squadron, flew the white ensign from the foretop, and the rear-

admiral, in his blue squadron, flew the blue ensigr from the mizzentop. In the end it was found inconvenient and confusing to fly different colours in action, and by Nelson's instructions Trafalgar was fought entirely under the white ensign. In 1846 the British Navy gave up the red and blue ensigns.

The chief place of honour for your flag is the head of the mainmast, called the maintop, the next is the foretop, then the mizzentop. The chief flag of the British Empire is the Royal Standard, and this is broken out on the maintop of a ship immediately the King steps on board. In merchant ships the ensign was formerly worn at the end of the yard-arm, and signal flags were run up to that point. Later these flags were flown from the *peak*. In steamers where the seat of authority has shifted from the poop to the fore part of the ship, and the signal locker has moved with it, the signal flags are run up from the bridge, on a special halyard which is rove through a small block on a stay connecting the funnel and foremast. The ensign is flown from the stern on a flagstaff and there is another flagstaff in the bows called the jack-staff—a relic of ancient days. It was formerly rigged on the bowsprit, and before that it kept the flag flying on the battlements of the little wooden castle that was built out on the bowsprit, and was the original fore-castle. The fo'c's'le (as it is now pronounced) has moved in-board more centuries ago than it has had letters worn out of its spelt name. But the little flagstaff kept its airy station out-board till dolphin-

on shore the famous old four-point bearing is the simplest method. You take note when you are a-beam of your spot, and then you wait for the moment when it bears 45° from the ship's course. When this happens you may take it that the distance you have travelled is the same as from the point where you made your first observation to the shore. It is not hard to guess an angle of 45°. It is the angle of half a square. And if you have a good eye for a right angle, you can make one by placing the tips of your forefingers together. Then join or slightly overlap the thumbs. Each hand will now be turned into a rough surveying apparatus measuring an angle of 45°. If you are on a ship where the dial of the log is visible, and legible from the passengers' deck, there is no difficulty about ascertaining the distances you have covered. Otherwise you will have to guess it from the known speed of the ship.

Doubling the angle on the bow is another method. It is not easy without an instrument, but may well be made guess-work of to fill in time. Note the angle made by the course-line and a line projected from the bow to an object on the shore ahead. Read the log. Read the log again when the angle is doubled. The distance between these points will be the same as the distance from the second point to the shore.

The following is a table of heights. To be able to work this properly you need to know the height of the deck you stand on. Any officer will give you the height of the bridge, and you may allow eight feet

per deck below that. Thus if you are *about* forty feet above sea level your range of vision to the horizon line will be *about* seven miles. If you can see another ship on top of the world so that you can just make out the bow-wave or the wake-wave this computation applies. If you can only see her funnels you will have to guess the height of the works you cannot see above the water and add the equivalent in miles. For lighthouses the height given in the table of lights must be translated into miles and added to the height of your position on board ship. The column giving the distance at which lights are visible is calculated not as from sea-level but as from fifteen feet above sea-level (implying in this case mean high-water at spring tides).

TABLE SHOWING DISTANCE OF HORIZON FROM VARYING HEIGHTS ABOVE SEA-LEVEL

Ft. above Sea-level	Miles	Ft. above Sea-level	Miles	Ft. above Sea-level	Miles
1	1·1	19	5·0	125	12·9
2	1·6	20	5·1	150	14·1
3	2·0	21	5·3	170	15.0
4	2·3	22	5·4	200	16·3
5	2·6	23	5·5	250	18·1
6	2·8	24	5·6	300	19·9
7	3·0	25	5·7	350	21·5
8	3·2	30	6·3	400	23·0
9	3·4	35	6·8	450	24·4
10	3·6	40	7·3	500	25·7
11	3·8	45	7·7	540	26·7
12	4·0	50	8·2	600	28·1
13	4·1	55	8·5	700	30·4
14	4·3	60	8·9	760	31.7
15	4·4	70	9·6	800	32·5
16	4·6	80	10·3	860	33·7
17	4·7	90	10·9	900	34·5
18	4·9	100	11·5		

KNOTS AND MILES

The following table is for the convenience of votaries of the auction pool. It is intended for use *with judgment* in connection with the wind scale.

READY RECKONER OF DAY'S RUN

Knots	Naut. Miles per Day	Knots	Naut. Miles per Day	Knots	Naut. Miles per Day	Knots	Naut. Miles per Day
8	192	14	336	19½	468	25	600
8½	204	14½	348	20	480	25½	612
9	216	15	360	20½	492	26	624
9½	228	15½	372	21	504	26½	636
10	240	16	384	21½	516	27	648
10½	252	16½	396	22	528	27½	660
11	264	17	408	22½	540	28	672
11½	276	17½	420	23	552	28½	684
12	288	18	432	23½	564	29	696
12½	300	18½	444	24	576	29½	708
13	312	19	456	24½	588	30	720
13½	324						

And followeth a table for the man who feels more at home when he can think in English miles.

KNOTS INTO MILES PER HOUR

(or Sea Miles into English miles)

Knots	Miles per Hour	Knots	Miles per Hour	Knots	Miles per Hour	Knots	Miles per Hour
1	1·152	11	12·667	16	18·424	21	24·182
2	2·303	12	13·818	17	19·576	22	25·333
3	3·455	13	14·970	18	20·727	23	26·485
4	4·606	14	16·121	19	21·879	24	27·636
5	5·758	15	17·273	20	23·030	25	28·788
10	11·515						

General Table of Nautical Values, etc.

7.92 inches	=	1 link
100 links 22 yards	=	1 chain
6 feet	=	1 fathom
100 fathoms 200 yds.	=	1 cable
6080 feet	=	1 sea-mile

(*Knots* are sea-miles per hour)

1 ton displacement of a ship = 35 cubic feet.

(That is to say that it is necessary to displace 35 cubic feet of salt water before there is sufficient buoyancy to bear up one ton weight. For fresh water the equivalent is 36 cubic feet.)

1 cubic foot of sea water weighs 64 lb.
1 cubic foot of fresh water weighs 63 lb.
1 cubic foot of pure water weighs $62\frac{1}{2}$ lb.
1 ton measurement = 100 cubic feet of space.
1 measured ton = 40 cubic feet of space.

On charts the depth of water is given either in feet or fathoms at low water, ordinary spring tides.

The speed of sound under water is calculated as being 4935 ft. per second when the temperature is 15° C. and the salinity 35 per cent. Or, for purpose of rough average calculations, it is ·8 of a sea-mile per second; that is, it takes 1·25 seconds to travel one sea-mile.

The speed of sound through air is four times slower than through water, being roughly 1100 feet per second.

Water one mile deep is just over one ton per square inch pressure. Glass balls when sent to great depths have had water forced into them through the pores of the glass.

Ocean Depths

The sea-bottom round the fringe of continents generally shelves gradually to a point approximately a hundred fathoms deep; this is known as the *continental shelf.* Below that, the gradient increases and is known as the *continental slope.* Below the 2000 fathom mark comes the *abyss.* It has been ascertained by experiment with sensitized photographic plates that sunlight in its most rarefied form does not penetrate as far as a thousand fathoms. Yet in the abyssal zone fish live—fish of strange and fabulous shapes equipped with light-giving organs at once highly complex and efficient.

Below the 3000 fathom mark lie the regions known as the *deeps.* In all, these deeps are estimated to aggregate 9,000,000 square miles, or 6·65 per cent of the sea-floor. Some of their names are geographical, but mostly, like mountain-peaks in new countries, they have been called after the first explorers to plumb them or after their ships. Often these deeps have two names, in which case the geographical is generally the

better and ought therefore to be preserved jealously. For instance the Tonga Deep is called also the Nares Deep. Surely the former name is the finer and the deeper sounding and ought to be the one handed on to posterity! The number of deeps at present known is fifty-seven: in the Pacific thirty-two, Indian Ocean five, Atlantic nineteen, and one at the junction of the Atlantic and Indian Oceans.

SOME OF THE PRINCIPAL OCEAN DEEPS

Name	Situation	Depth in fathoms	Equivalent in ft.
Mindanao Deep	Philippine Islands	5,350	32,100
Challenger Deep	Marian Islands	5,269	31,614
Porto Rico Deep	West Indies	5,227	31,362
Tonga Deep	Friendly Islands	5,022	30,132
Swire Deep	Philippine Islands	4,767	28,612
Tuscarora Deep	Japan	4,655	27,930
Tizard Deep	South Atlantic	4,030	24,180
Sunda Deep	East Indies	3,828	22,968
Murray Deep	North Pacific	3,540	21,240
Baily Deep	North Pacific	3,432	20,592
Chun Deep	North Atlantic	3,318	19,908
Moseley Deep	North Atlantic	3,309	19,854
Valdivia Deep	Junction of Atlantic and Indian Oceans	3,134	18,804

CHAPTER VI

STYLES AND TITLES

CAPTAIN is a title that has always been popular, and no other word signifying headship is so prevalent in all affairs, the army, the navy, the merchant service, mining, schools, games, and of course bell-ringing. But the name is chiefly associated with the sea, and of the sea services, more especially with the merchant service. One speaks of a sea-captain meaning not a naval officer but a merchantman. Yet the official title is not captain at all, but master, or more fully master-mariner. The name master is more seamanlike and more singular than captain, and is far more deeply rooted in the English tradition of the sea; it seems a great pity that it should not have live currency outside of the Admiralty courts. Shipping companies are not content with either, and for some time have been trying to bring in the name *commander*. Albeit the title commander is junior to captain in the navy it sounds grander, and I suspect that that is the reason why it is favoured by the owners of large vessels; it has an extra dash of gold braid about it. Master is better. On the rough waters of Galilee it has been applied to a state higher than royalty. Why not revive this birthright?

Old Man is the familiar, and I may add respectful, name by which the captain of a ship is known among his subordinates. I have never heard a satisfactory explanation of the origin of the term; but *skipper* is from the Dutch and answers to Chaucer's shipman.

The full powers of a ship's captain have never been properly defined, as it has always been recognized that he stands between civilization and the devastating power which overruns more than two-thirds of the earth's surface and is yet out of the control of man. Therefore, provided he acts with reasonable wisdom at critical moments, when the sea threatens, the law is always on his side. Test cases have established certain points of interest. He can, for instance, order a passenger to leave the table for unseemly behaviour. And he can order a passenger to man the pumps, but only if danger to the ship is proved. He can also seize his luggage if he has not paid his fare. He must not, however, under any pretext order a passenger to go aloft, or do a sailor's job. To solemnize matrimony is not among his powers, though he is legally entitled to get on with the job by publishing the banns. But for births and deaths that occur on board he must act as registrar. A child born on a British ship is, in the eye of the law, born on British soil and can claim to be British-born; he is regarded in law as a little parishioner of the borough of Stepney.

A captain's first consideration is not for his men, nor for himself, but for his ship. The idea is deeply rooted both in law and sea life that the captain can

do no wrong while he is acting for the safety of the ship. If he cannot get necessary repairs effected any other way he can proceed to sell up the cargo for that purpose. And he can jettison cargo on the high seas if he thinks the safety of the ship depends on it, even if the owner is on board and tells him not to. In fact master-mariners are the only really privileged class left—there 's no getting the better of them.

Until very recent times the officers junior to the captain were called mates, the chief of whom was called *the* mate. He addressed the captain as *Sir*, and was himself, alone of all the ship's company entitled to the prefix of *Mr.* Even the captain was supposed to use this handle, at any rate on duty. The mates are now all called officers, except in smaller ships where the old ceremonial survives. The mate has become the chief officer. He is responsible for navigation and for the stowage of the cargo and the deck-gear, including deck games. On ships carrying large staffs he is not to be confused with the first officer, who is junior to him.

When a ship carries enough officers to stand watch, two at a time, one only is recognized as responsible and is called the officer of the watch. He has a great many duties in addition to walking up and down. He must constantly look to it that the side-lights and mast-head lights are kept burning. With the electric system this can be checked by small pilot lamps which keep aglow on the bridge itself so long as the circuits are in order. His vigil is generally reinforced by the

look-out man who strikes ship's time on the bell in the bows every half-hour and sings out each time: "All 's well, lights burning bright, sir!" He must watch the compass and the course, enter up the reading of the log and the barometer at intervals, sometimes take sights on sun and stars, and do a variety of other things besides always keeping a "sharp look-out." For four hours the safety of the ship will depend on him.

Watches on the bridge and in the engine-room are "stood" four hours on. And these watches are 8 to 12, 12 to 4, 4 to 8. They are called the fore-noon watch, the middle watch, and the night watch, and are generally fixed for the whole voyage. But if it is desired to have a change round, the watch from 4 to 8 is split into two two-hour watches called dog-watches. Ship's time is told in bells which are struck every half-hour. At the end of eight bells, the full watch, the round begins again. Thus 8 o'clock, 12 o'clock, and 4 o'clock are all eight bells, 4.30 is one bell, 5 o'clock two bells, and so on. On most ships the bell which is struck is on the forecastle-head. But in ships where a look-out man is stationed in a crow's nest on the fore-mast, the bell is hung there, and it is often customary in such case for this man to receive his cue from the bridge where a small bell is struck first, after which he sounds his larger tocsin.

The sergeant-major of a ship is the boatswain (pronounced "bo'sun"); he stands between the officers and

the crew and sees that orders are carried out. His name is probably the oldest that goes to sea in a modern ship, as it is derived with little alteration from the old Norse and links us up with Viking days. In spite of all innovations he has still preserved his curiously shaped shrill whistle known as "the pipe," almost miraculous in its powers of penetrating the noise of a storm. The boatswain is generally only visible to the vulgar gaze of passengers when he is in charge of a hosing party washing down decks. In his sea-boots and tight-fitting petty officer's jacket he appears, stern, seamanlike, and bent uncompromisingly on the business of the moment. He has not a word of gossip for any one: there belongs to him none of the suavity of the bridge, nor the breezy politeness of the forecastle. He, at least, smacks of the chantey days. Long may he keep his name, his pipe, and his sea aloofness!

On all ships of any size there is a boatswain's mate, or one who acts the part when necessary, if he has not actually signed on as such. Next in rank is the able-bodied seaman, that is if we do not count the loafers. The loafing class according to the critical old sea usage was made up of the carpenter, the sail-maker, the cook, and any others exempt from the arduous tasks of making and shortening sail. Able-bodied seamen are universally known by the initials of their calling; they are A.B.'s. From the A.B.'s are picked four men to take turns in steering the ship —"to take a trick at the wheel." These men are

called quartermasters, from the position of the wheel and binnacle in old days, which was on the quarter-deck. The word has no connection with the army officer, who gets his name from having had charge in former times of billeting and sleeping quarters for the troops.

Below the A.B. is the O.S.—ordinary seaman. The list is closed by the deck-boys. Of the loafers, the cook, the steward, and the captain's tiger can only be seen in anything like their pristine state in the remaining sailing-vessels and small tramp steamers. To be called the "son of a sea-cook" is matter for reprisal. And this is not entirely to be accounted for by the fact that a large part of the profession was formerly made up of black men. A certain mystery of witch-craft attaches to their memory. More than likely the tradition of the sea-cook goes back to the days of augury by entrails, weather luck, and weather prognostics by sacrifice. At any rate the crew's name for him was always "the doctor." There is reason to think that he regarded himself as a mystic character. Emerson tells us that in one of his Atlantic crossings in sail, if the weather was bad the cook would rush on deck suddenly and leaning into the wind would cry out: "Blow, you devil, blow! Me do tell you blow!"

There is nothing profound in the carpenter's nickname of "Chips." But the profession in the past has cut a figure in superstition which, if it is easy to see, is hard to define. The reputation of Chips at sea is slightly sinister. He was supposed "to know a thing

or two," and to have a kind of acrimonious philosophy, like a shoe-maker, only worse, for sea air tends to fix ideas and then distort them in a remarkable manner quite unknown ashore. I knew a ship's carpenter who set out to test every one's intelligence by one question. As it happened I passed the test in all innocence. He asked me if I had ever seen a parrot's egg. I spoke the truth and said, "No." He bent his skinny face towards me and said in his shrill, skinny voice: "No! nor you never will!" I found out presently that he was unshakably convinced that parrots did not lay eggs. Whether he thought the birds were viviparous, or whether he held the gooseberry bush theory, I don't know. They did not lay eggs, that was flat, and any one who said he 'd seen a parrot's egg proved himself to be a fool and a liar.

The sail-maker was not wholly canny either. He was the ship's coffin maker, for the corpse at sea fares forth sewn up in canvas. On the iron ships of to-day the carpenter still goes to sea. As a matter of fact one of his routine duties on the sailing-ship was to take soundings of the well at regular intervals, which showed if there was any leakage. And this duty is still the function of the carpenter. He also has charge of the hatches, ventilator covers, and several things which are not exactly carpentry. In the modern sense of the word he is by no means a loafer. The sail-maker also survives in the sailless ship. Although no canvas is carried aloft there is a good deal used in awnings, covers, dodgers, etc.

The sea-cook has simply vanished. His place has been taken by a department under a chef which differs nothing from a shore personnel. The steward has multiplied a hundredfold, become a department too, and begotten another department—the purser's. Nevertheless the steward has not vanished like the sea-cook, but he has changed more than any other recognizable relic of sailing-ship days. His namesake in old days was often morose and surly with a large mixture of the shark and the ship's rat in his composition. To-day he is one of the most cheerful, considerate, tactful, and efficient people alive, an astonishing and yet genuine product of an age of democracy.

In the British merchant service, before the war, there were two schools of thought concerning uniform. One part wanted to follow the navy in this respect, the other was fiercely independent, anti-navy in all ways, and regarded uniform as a badge of servitude. And it must be admitted that some of the finest types of seamen belonged to the last group. But the war has altered things. To-day the merchant service is full of officers who have served with the navy and are now on the reserve. This association has cleared away a great deal of misunderstanding and unfriendliness, to say nothing of the prejudice to uniform. Nevertheless uniform is only uniform in one company. In respect of cut, wearing of rank, etc. it is not a universal dress as merchant-service uniform. And so long as this is so it will remain open to the old gibe of *livery*. When I was a young man I innocently

asked the captain of a tramp steamer why he preferred to go on the bridge in a bowler-hat rather than a seaman's peaked cap. He replied, "Because I 'm not a bloody flunkey." When, however, we were out of the Mersey, and away from the eyes of fellow seamen, the bowler-hat was stowed carefully away and replaced by a regulation peaked cap—only with no badge on it, just coils of black braid. The captain kept the sea in this until we got to Genoa. Standing into that harbour, the bowler-hat was assumed once more, also a clean white horsy-looking stock. And in this rig the captain leaned over the bridge and greeted all the Italian tug-masters one by one who rushed out to offer assistance, telling them slowly, in plain English, to go to Hell.

A standard dress has actually been prescribed since the war by Order in Council, which was tantamount to making any non-conforming costumes illegal. But this strong line was not maintained, and the companies still go their own way. As a matter of fact variation has always been the rule of the sea, as far as merchant shipping is concerned, summed up in the sailors' adage: "Different ships, different long splices."

CHAPTER VII

PATHFINDER AND POWER-CHIEF

THE strongest point of dissimilarity between the sailing-ship and the steamer is that the crew of the former are all seamen, whereas the crew of the latter are only half of them sailors, while the rest—the engineers—have always got one leg on shore.

In fact, every steamer is necessarily divided into two camps—the Bridge and the Engine-room, and it is the rule rather than the exception that there is a great gulf fixed between them. Of the two parties it must be confessed that the exalted fellowship, the Bridge, is the more intolerant, and small wonder. They cannot forget the days when driving the ship was a matter between God and themselves; when speed—the ship's prowess—was a matter of human skill, and was achieved by toil, endurance, and a consummate mastery of art that was all their own. The murky steam menace, smirching the trim canvas and paint-work, and smudging the sacred deck with oil, was suddenly and unfairly, like an archipelago of volcanic islands, pushed up in proper working order from the sea-floor —an irruption of eruptions. From this time ships began to go to sea with less and less canvas and more and more machinery. With the machinery there

were men supplied to work it, and these individuals had no known status in the ancient world of seafaring folk. They were not even dignified by the name of engineers. They were called mechanics, and that name at that time enjoyed no more honour than it did in the time of Shakespeare.

To-day a ship is no longer an absolute monarchy but a constitutional one. The captain is still the king, but the mate is no longer the prime minister. In fact, the mate has mysteriously disappeared. The man who used to be called the mate is now called the chief officer, and is no longer the prime minister but merely the heir-apparent. The prime minister is the chief engineer. See how his power has spread upwards! He began by just controlling the mechanism which drove the ship ahead or astern. Soon it was found that a power-driven ship could no longer be steered by hand, so the steering-gear came into his province. Next the anchors ceased to be broken out to the lilt of a gay fiddle and the sound of the chantey, and had to be weighed by steam. The engineer, having got his footing on deck, began to work all the cargo by steam winches. Then the lighting fell to him, and thus he got not only to the bridge but the the mast-head. The chief steward was next made a dependant by the wholesale capture of the commissariat and its incarceration in the refrigerator. His last and most deadly conquest is that of the mariner's compass. He has vanquished the old magnetic instrument, hoary with the mystic honours of discovery and

sea-power and language—metaphor and theological analogy, by a real "engineer's job" in the shape of the gyrostatic compass, which will not only give the steersman his bearings but, if desired, will steer the ship of itself. Thus this powerful prime minister has subdued the principality and all other powers on board ship except the two cabins occupied respectively by the purser and the wireless operator. So much has he prevailed at sea that Sir Alan Anderson, President of the Institute of Marine Engineers, could say with truth in his presidential address in 1928: "To keep the prosaic steamer and avoid the romantic sailing-ship, there is no boon that the world would not gladly pay if the engineers of the world could hold the world to ransom." For all that, the marine engineer still keeps one foot on shore as he did in 1840, and though he has been to sea for three-quarters of a century, he has never become a sailor. The sea has long ago adopted his engines and his engine-room, and made them nautical things, and part and parcel of the ship they serve. But the sea has not prevailed on the canny Scot who governs them to exchange the practical for the mystical. Though his triple-expansion engines may be the poetry of the ship, he has never been inveigled into calling a connecting-rod a gander's leg, or to changing his manner of speech from "getting abreast" of a distant light to "getting abeam" of it.

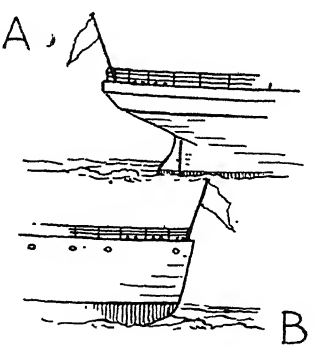
The chief engineer has managed to keep all below the engine-room hatch inviolate from the seafaring

poetry-stuff. But where his works have been exposed to the weather and the sailors, he has not succeeded so well, and as sure as the masts of old had *hounds*, so must the barrels of his capstans and his windlass have *whelps* to get a good bite on cable and hawser.

But in British ships, at any rate, the great man's position in his own engine-room is not all that it appears to be. For in law he is not held to be either of sufficient intelligence or integrity to take the responsibility of looking after his own safety-valves. And the Board of Trade orders that these devices shall be made to lock, and that the key shall be given to the captain. If there is a failure in this respect it is the captain who has to stand the racket to the tune of £50. But this expensive privilege is no doubt a great consolation to the Bridge.

Since sailing-ships have gone, nautical language, as that dialect is properly understood, is already a dead language. It lives in memory but is no longer fully spoken, and when the last of those great men die who learned their trade "in sail" it will vanish even from the ken of the student and the antiquarian, for the simple reason that it was of too purely a Doric order ever to reduce to writing. Any new coinage will come rather from the laboratory or the engineering shop than from between the weather and the water —that prolific old mint is closed. How much it enriched the landsman's language while it lived, Mr. Pearsall Smith has enlightened us in his delightful book, *Words and Idioms*. But that glorious concep-

tion of a ship as a feminine being, and the rich heritage in names of a ship's parts, will not quickly lose the places of honour they have won, in spite of engineers' bans and comic piracies of "she" and "her" on the part of motorists. Shakespeare, speaking for John of Gaunt, said wisely: "More are men's ends marked than their lives before," and the old sea-names handed on to the steamers have become dearer as they have become rarer.



TYPES OF STERN
A. Counter stern. B. Cruiser stern.

CHAPTER VIII

THE LAND

GEOGRAPHY, topography, geology, with all that they stand for, are summed up for the sailor in the simple expression "the land." *The* land, not land, that is the point worth noticing. Even Longships and Land's End are carefully altered by all good mariners to The Longships, and The Land's End. The converse is almost exactly equal and opposite; sea is sea to a sailor, while to a landsman it is *the* sea. It is the holiday-maker who goes down to the sea in ships, a sailor simply goes to sea. Use of the definite article in this case subtly conveys a sense of strangeness. The sea, with its endless monotony of surface and horizon, appears to the landsman to be much the same all the world over. But to the navigator it has a definite configuration. There have been illiterate old captains who could sail the North Atlantic and keep track of their ship's position without the most ordinary aids to position-finding, and never make a mistake, in any weather. And to such men the land has always been the land, whether it was polar, temperate, or torrid. They were not interested in fine distinctions such as the name and nation of the race which occupied it. It concerned them merely as an element definitely

known to be a non-conductor of shipping—the one thing of which they were more afraid than the sea.

The land certainly does not show itself to advantage when seen from the sea. Cliffs lose their height, and all local colour and local interest is lowered in tone and emphasis to the dwindling point, as if the sea were bent on depreciating the personality of its obstinate rival. For this reason, no coast should have its scenic values judged from the water, unless it is specially rich in colour and lights, or highly spectacular. The impression is generally as disappointing and untrue as a photograph.

Besides its lack of feature, the coast always wears a disinterested air, as if things passing, and events taking place on the water, had no meaning for it. But the contrary is true. It is full of eyes, by day and by night, which anxiously strain towards the mariner and the fisherman, and watch for any sign they may give of "speaking" or distress. A ship speaks properly to the eye only, and does so by bunting in the daylight, and by flare, flash-lamp, and rocket at night. Wireless is quickly superseding these time-honoured methods of communication with the shore, but the conservative seaman is still guarded in allowing this innovation, which is not his own mystery, an acknowledgment as ship's speech. You speak the land, and other ships, with flags and lights, or you *wireless* them.

These watchful eyes alluded to are generally directed from one of the three following points: a lighthouse, a Lloyd's signal station, or a coastguard station. In the

British Isles the coastguard, which formerly watched over and patrolled almost the whole of the sea-board line, till the ungentle art of wrecking became obsolete, and smuggling was lifted from the rough hands of blackguards to the refined imaginations of authors, is gone. That familiar shape, embodying alertness, cleanliness, cheerfulness, and sea simplicity, whose inevitable path along the cliff-top was picked out with whitewashed stones, has passed away with the war and pre-war times, the most English of English things. The name remains, there is still a coastguard service. But it exists for life-saving only, and has no cutlass-rattling associations lit by the romantic glare of the false beacon and the flickering cavern torch. It is now a branch of the Board of Trade services, its activities are entirely humane, and the personnel is vastly curtailed. It is quite otherwise in the U.S.A., where smuggling has assumed proportions never dreamt of in any old-world country. There, the coast-guard is a very active man indeed and has a chasing speed in his small vessels that would have amazed the keen commander of the old-time Revenue cutter.

Lightkeepers, like the old coastguard, are picked men, on whose natural integrity a life given up to watching has surcharged something of the ascetic devotion of a saint. Indeed, there is that about a light-house, and the folk who tend it, which borders on the sacred, and is another of those curious points of contact between religion and the sea. It is a fact worth a thought, that in the century which has lifted us with

such whirlwind rapidity from the medieval to the modern, while it has been the rule to lose in beauty and the picturesque where we have gained in efficiency and increased values, the lighthouse has been an outstanding exception.

Little more than a hundred years ago, lighthouses were burning wood fires or smoky wicks fed with animal and vegetable oils, and were in the hands of private owners who thought more of the dues they were entitled to collect than the trimming of the lamps. The modern lighthouse is a thing of beauty in the day-time. With its shimmering lantern rising from a tapering pillar of masonry, it seldom fails to improve and set off both its sea and land backgrounds, while at night the roving violet beam, wheeling to the limits of the horizon with precise persistency, sorts with the constancy of the stars and the monotony of the waves in a way which strikes the imagination like no other thing.

Lighthouses fall into two main groups: those used to guide ships when approaching the coast from seaward, called leading lights, meant to take the place at night of what by day would be a sight of land; and those whose beam is for local illumination only, such as breakwater, harbour, and fairway lights. These groups fall into further divisions of *fixed*, *flashing*, and *occulting* lights, in order to distinguish one light from another with certainty. The difference between flashing and occulting is in the relative duration of light and darkness. In an occulting light, the gleam

occupies either more time than the eclipse or an equal time. This principle is further varied by having cycles, called *group-flashing*, *group-occulting*, *fixed-and-flashing*, *fixed-and-group-flashing*. And to make perfectly certain that no one shall miss his sea-mark, the changes are rung over the whole gamut again with the addition of coloured lights. This is known as *alternating*.

In addition to the above many lighthouses have coloured sectors—red chiefly—giving warning of an outlying reef of rocks in line with the sector. Sometimes the sector forms part of the lantern. But it is often a small window with coloured glass in a different part of the tower.

Most lighthouses are equipped with fog-signals. Here again we have what must be admitted an amazing artistic success. The instruments used to notify approach to danger are the siren, diaphone, reed-horn, bell, and gun. A master musician could not have chosen and designed fitter creations for giving voice to the titanic dumbness of the fog. There is no doubt that they add a grandeur to sea-sensations which our forefathers were not able to enjoy, except of course Sir Ralph the Rover and the Abbot of Aberbrothok.

But sound is a jade almost as fickle as the fog, and it sometimes exhibits the phenomenon of being quite inaudible close to the origin of noise. One remembers that during the war, when the guns on the Somme front could be heard in the peaceful orchards of Kent,

the same barrage was at rare periods not heard by so much as a mutter a few miles behind the line. This danger is remedied by the submarine bell and oscillator. The extreme range of the former is said to be fifteen, and the latter twenty-five miles. These ranges are quoted from the British Admiralty List of Lights, but I have seen it stated on good authority that the oscillator has been clearly heard sixty miles away. At close quarters, they never fail to give warning. And they have this advantage over aerial fog-signals, that the direction in which they bear from the ship can be accurately ascertained. But as only a relatively small number of ships have the necessary apparatus to detect their signals, they are not anything like so widely distributed round the coast as the ordinary fog-signal.

To detect a submarine signal, a ship must have a microphone fixed under water on either side. In the two corresponding telephone receivers on the bridge, the side nearer the line of sound will be louder. If the ship is swung towards this sound till it becomes equally loud in each receiver, the head of the ship is then pointing towards the origin of it. By proceeding on her former course, and later taking further bearings, her position on the chart can be verified if necessary.

The history of lighthouses begins before the Christian era. Records tell of the famous Pharos of Alexandria, one of the Seven Wonders of the World, with its tower four hundred feet high, a work of the fourth century B.C. And before that there was one at the

Hellespont. The Romans were lighthouse builders. But these towers were all on the mainland, and their powers of illumination were very small. Lighthouse engineering as a special science did not begin till the eighteenth century, when the problem of building a tower on wave-swept rocks was at last tackled. The Eddystone Lighthouse was the first of this class.

The pioneers of tower construction of a kind to withstand the force of waves were the British, while the French were the first to solve the problem of lighting. In the United States in 1789 there were only eight lighthouses, in 1820 there were fifty-five. In the fifties a commission was appointed to make a tour of inspection of British and French lights, after which, in 1852, a new government department called the Lighthouse Board was set up, which took matters in hand vigorously and brought the coastwise lighting of both the Atlantic and Pacific seaboards up to European standards. Three outstanding triumphs of American lighthouse engineering are the lights on Tillamook Rock off the coast of Oregon, on Minnots Ledge off Boston, and the caisson lighthouse on the sands of Fourteen Foot Bank off the Delaware. In most countries the maintenance of coast lights and beacons is in the hands of a government department. In Great Britain it still rests with private corporations who are empowered to levy light-dues.

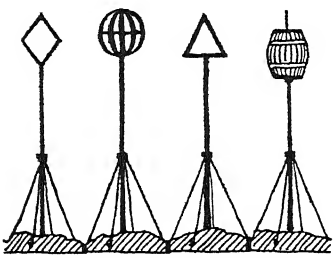
Lighthouses round the British Isles are maintained by nine different authorities, chief of which is Trinity House (London). Trinity House is not a govern-

ment department but a seaman's guild. It received its first charter in the early days of the sailorly King Henry VII. And though it was dissolved by the strong acid of the Puritan Parliament in 1647, it came back into its own at the Restoration. Trinity House controls most of the pilotage as well, and the Elder Brethren act as nautical assessors in the Court of Admiralty.

The most remarkable thing about Trinity House is that it is the one medieval guild which has not only retained its original integrity but has increased both this and its scope of usefulness. The guilds, which in the Middle Ages were all-powerful, have, for the most part, decayed to mere memories; in the provinces the recollection of them is barely kept alive by annual or periodic processions and ceremonials, while in London one hears little more of their activities than the news of magnificent dinners eaten by the Worshipful.

Not less important than the lighthouses and watching stations, are the minor sea-marks, both fixed and floating—beacons and buoys. The word beacon used in connection with the sea has the opposite of its inland significance. It means a tower or mast, on which no light is shown. Sometimes its function is to mark a rock, sometimes a submerged reef or shoal, sometimes the course of a channel in an estuary. Sometimes beacons are grouped, one behind another, on the high land and, when observed from seaward to be in a straight line, give a bearing by which a ship can check her compasses. Such are the White

Ladies on Carmel Head at the north-west corner of Anglesey, on Liverpool's great sea-highway to the south and west. Some shallow estuaries and harbours bristle with the smaller kind of beacon, generally called perches, chiefly for the use of fishermen. These humble home-made erections, which can boast no connection with Trinity House, are rough poles stuck in the mud, surmounted for purposes of distinction with a wood triangle or grating, or an empty barrel. Yet, though never so humble, they are the most picturesque of all sea-marks. Set, as the need that created them demands, among low coast-lines, in regions forlorn, curlew-haunted, treacherous, and eerie, they have set off the gems of many a sunset and summer's morning pride, and have beckoned to imaginations of poets and painters far beyond the deeps they were intended to delineate.

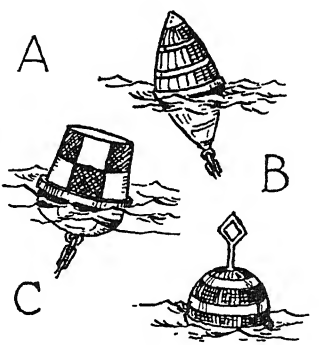


PERCHES

A. Diamond. B. Cage.
C. Triangle. D. Barrel.

The function of buoys is four-fold: to mark an obstacle, a fairway, an anchorage, and for purposes of mooring. In a fairway you may meet with three kinds of buoys, distinguished both by shape and colour. There is the conical-shaped buoy, which must be of one colour only, and is generally red. This is to be

kept on the starboard hand going up a river or entering a port. Then there is the round, flat-topped buoy, technically called a *can*. This must be kept to port. It may be painted single- or parti-coloured, but it must be different from the starboard-hand buoy. It is generally black. The third kind is round, and is usually surmounted by a staff bearing an iron triangle or diamond. The spherical buoy marks the extremities of a middle ground which divides a fairway into two lanes, and the rule is that the diamond device shall adorn the buoy at the seaward end of the middle ground, and the triangle that at the inner end. The last port and starboard buoys at either end of a fairway may be marked by a staff surmounted by a cage and a globe respectively.



Buoys
A. Starboard hand. B. Port hand. C. Middle ground.

These fairway buoys are easy enough to distinguish when they mark an entrance to a river or harbour, as there can be no question in such cases as to what is meant by starboard and port hand. But when a channel is buoyed which leads to no harbour, and is perhaps out of sight of land, the matter has to be decided by means other than plain direction. In this case, the main stream of flood tide is taken as the

guide, and the British Isles is divided into five zones for purposes of giving the mariner the key tothe riddle.

The significant colour of all devices marking sunken wrecks is green—Davy Jones's emblem. A hulk moored for this purpose is painted green, and shows green lights at night. A wreck-marking buoy is also painted green. There are buoys which carry lights, and others with special mechanical devices for giving warning, notably bell-buoys and hooting buoys, which are worked by wave action. The hooting or the whistling buoy has a long cylinder-like pipe protruding into the water, to reach a depth unaffected by the rise and fall. In this the sea water acts as a piston when the buoy bobs up and down. Air is thus compressed and forced through the whistle with a strange, melancholy, bovine noise.

Buoys require a great deal of attention. Those marking sandbanks in the open sea are frequently shifting their position, and often break out of their moorings and go ashore. This is a great expense to small ports, particularly as in most cases since the decline of sailing-ships, they have a reduced income in the way of dues. But a port is always jealous of her authority, and loath to lay it down to appease certain unimaginative rate-payers, though it frequently happens that the port has really ceased to be a port, while another place has taken the shipping but has to pay her the dues. Thus Liverpool was formerly "a creek in the port of Chester," and it was centuries before it could shake itself free.

All these signals, visual and aural, are what one might describe as simple signals depending on the waves of light and sound, refinements, in fact, of methods of signalling that have been in use among all nations since history began, and, with the exception of the submarine signal, requiring no apparatus for receiving, other than that provided by Nature. But the time is at hand when this beautiful system of sea guidance is to be superseded by an innovator born in our own generation. Its name embodies the poetry of the past in metaphor, for it is called the *wireless beacon*.

The superior advantages and variety of uses of this rayless and voiceless sea-mark makes it fairly safe to predict that it has not only come to stay, but come to supersede. At present in the British Isles wireless beacons are being fitted, by the Marconi Company, as adjuncts to lighthouses and lightships. Their functions are mainly to give a ship a bearing, and this bearing, when compared at the instant of being taken with the ship's course, gives the position of the ship on the chart. When the beacon is installed in conjunction with a submarine oscillator, the distance between ship and beacon can also be ascertained.

The beacon is a wireless transmitter, on the continuous wave principle, like a broadcasting station. Its signals are automatic, governed by a master clock which sets the generating power in motion, sends out in Morse code the dots and dashes which are the distinguishing mark of that particular beacon, and

then economically cuts off the power, stops the generator, and ticks on till it is time to signal again.

On board ship there is a double frame-aerial, with whose single principle the owners of that strange instrument, the suit-case wireless set, will be familiar. That principle is, that when the frame aerial is at right angles to the direction of the electric waves proceeding from the broadcasting station, the effect is at its maximum. When parallel, the effect is nil. The aerial of the *direction-finder* is therefore double, one frame being at right angles to the other. The manipulating device is in the wireless cabin, and the duty of detecting the bearing belongs to the wireless operator, whose ear is trained to listening for fog-signals to an extent that no seaman's can be. The operator works two dial rheostats and, as he listens in, gets a point of elimination of sound, then reads the bearing off. This he telephones to the bridge, where the computation is completed. In ships which carry a gyroscope compass, and a compass repeater has been added to the equipment of the wireless cabin; the whole computation can be done by the wireless operator, which is an advantage in accuracy, as time is bound to be lost between the two readings even with the smartest telephonings.

Equipped with a direction-finder, not only can a ship verify her position in relation to the land, but in relation to other ships in their courses, which is of the utmost relevance in times of fog.

The wireless beacon in connection with the sub-

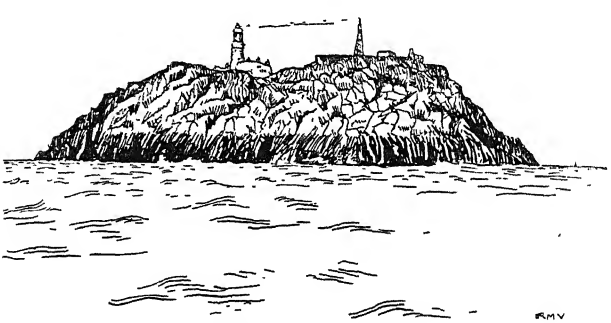
marine oscillator is, as before mentioned, for giving distances from shore only. The master clock controls both instruments directly. It sends out a signal electrically through the ether, and simultaneously by sound-wave under water. Both are received on the ship. But, whereas the reception of the wireless signal is instantaneous, the sound-wave takes a whole second to travel ·8 of a sea-mile. As this use of the wireless beacon is meant for anxious moments, when time for doing sums is scarce, the master clock renders one further service. It sends out from the aerial a series of dots following the signals, with an interval between each dot of 1·25 seconds, which is the time occupied by the wave of the oscillator in doing a sea-mile. Thus the number of dots gives the nautical mileage. If the sound-wave arrives in the captain's ear simultaneously with the first dot, there will certainly be mental arithmetic on the bridge.

Direction-finding was first made use of during the war, for locating the position of a submarine which had come to the surface for the purpose of using her wireless apparatus. Direction-finding stations were established ashore, and as soon as the submarine made her signals, the shore stations, which were in telephonic communication with each other, laid off cross-bearings, located her position, and sent off a bombing plane to the spot.

An interesting instance of the varied uses the direction-finder can be put to, was shown when the Norwegian steamer *Capto* lost her rudder in mid-

Atlantic. Her call for help was picked by the English steamer *Sachen*, who made towards her. Some way off, the C.P.R. *Montclare* picked up the messages and became intensely interested in the situation, when it became apparent that the *Sachen* could not find the *Capto*. Then the captain of the *Montclare*, with his direction-finder, plotted the position of both ships, and so was able to guide the rescuer to the rudderless castaway, though he himself was hundreds of miles elsewhere.

This instrument, which is making its way with the humility of a prophet, is in reality a great reformer of navigation; and the time may not be far hence when the magnificent wheeling beams of the high-powered lighthouse will be quenched for ever, and the thuttering boom of the Trinity gun, and the banshee cry of the land siren, be heard no more in the fog.



WIRELESS BEACON

CHAPTER IX

LANDFALLS

THIS chapter on landfalls must be a very practical chapter, all facts and figures. Yet, leaving facts and figures to themselves, a whole book could be written on the subject. The best memories of voyages are the landfalls—from the first sight of foreign soil to the lights of home. And who can forget the great *chefs-d'œuvre* of seascape—the Peak of Tenerife on a clear dawn ; the Mediterranean coasts ; the sacred islands of the Japanese Inland Sea ; the Sierra Nevada of Southern Spain whose snowy peaks, palely fired at sundown, are seen first, as a world of the upper air, having no contact with the horizon; the great glaciers of Iceland under the moon; the glimmering cliffs of Dover ; the vision of the New World at the gates of the Hudson River?

But whatever the land is, whether it has grand contours or flat, wind-swept beaches, it touches something in the heart that the traveller glories in. Yet no landfall is perfect without that small touch which human curiosity craves, a knowledge of the local name, and of its place on the map of the world. But generally (and necessarily) at the moment of landfalls there is never a ship's officer to be seen on the passenger decks,

and the average sailor, whether he be ordinary or able-bodied, is notoriously vague in his sense of local geography. The following tables and maps are intended to be of use in these emergencies, at any rate in one quarter of the globe where the trails are well blazed but the blazes (pun of necessity) are not intimately known.

In "making" the land, sailors naturally aim at a point where there is a lighthouse in order that they may be sure, when getting there, of having hit off the right place. Accordingly lighthouses are planned to meet these requirements and are made to look distinctive, by day as well as by night. Thus, one lighthouse will have a white tower and a red lantern, another will be all black from top to toe; one will be round, another hexagonal, another octagonal, etc. At night each will have a characteristic cycle of flash and eclipse different from its neighbours in that particular area.

The table contains the principal lights only that are likely to be seen in the ordinary way. A graphic system of "flash-spotting" has been adopted to facilitate identification in print after the light has been picked up. The character of the cycle is shown first, with its duration in seconds. Then follow symbols showing how the cycle is made up—circles for the beams and bars for the eclipses. There is a figure over each circle to indicate the duration of a beam that is calculable, and a figure under each bar showing the length of the eclipse.

LIGHTHOUSE IDENTIFICATION

The way to identify a light is to take a good look at it and note the following points. Is it a simple flashing light, the flash appearing at regular intervals? Or is it a light that, after flashing once or twice, with short eclipses, has a prolonged period of darkness before the series of flashes begins again? If so, it is a *group-flashing* light. You may then count the flashes and look for a corresponding number of circles among the group-flashing lights in the list. If a doubt remains of its identity, a comparison of the time intervals should settle the matter. If the light-period is longer than the interval of darkness, or equal to it, it is an *occulting* light and will be shown with the bar before the circle. If the light has a colour alternating with the white light it is an *alternating* light, and the coloured flash will be indicated by a circle of different character from the one which stands for the white light. Red sectors and red windows are not mentioned in the list, though many of the lighthouses given have them, their use being to indicate the line of some outlying rock or reef.

Our simple diagrammatic method does not lend itself perfectly to describe the *fixed-and-flashing* lights (of which there are several on the Canadian coast). A fixed-and-flashing light is one which shines with a medium power for a certain interval like a fixed light, and while so shining has its brilliancy instantaneously intensified once, or more often, as required by the character of the light.

In judging the distance off the land at the first

appearance of a light over the horizon (in conjunction with the table of heights on p. 65) it must be remembered that the distances computed in the "Distance visible in clear weather" column are all reckoned as from fifteen feet above sea-level. A light is only referred to as being *seen* when the actual source of it at the lantern is visible clear above the horizon. But the wheeling beam of a lighthouse is often descried far outside the radius of its official visibility. The light, when you cannot see the source, is called the *glare*. On a clear, dark night the glare of a high-candle-powered lamp may be picked up as much as fifty miles away.

IDENTIFICATION TABLE FOR PRINCIPAL LIGHTS ON BOTH SIDES OF THE NORTH ATLANTIC

IDENTIFICATION TABLE FOR PRINCIPAL LIGHTS ON BOTH SIDES OF THE NORTH ATLANTIC

Lights of 1,000,000 candle-power and over are shown in heavy type, thus: **SKERRIES.**
Lightships have their names in italics, thus: *Fire Island.*
The light is shown thus: ○ a white light; ● a red light; ⊙ a green light.
A long eclipse is indicated by a long horizontal bar, thus: ——, a short eclipse, thus: —
Fl. = a simple flashing light, thus: ○——.
Gp. Fl. = a group-flashing light, thus: ○—○——.
Alt. Fl. = alternate flashing (a light with more than one colour in the cycle), thus: ○—●—
F. Gp Fl. = fixed group-flashing (see prefatory note)
F. = fixed light. It has no eclipse and does not vary. Shown thus: ○
Duration of cycle is given immediately after character of light, thus: Gp. Fl. 30.

Ports of Eastern Canada

Numbers on Map 1	Character of Light Figures in Seconds	Candle-power	Height in Feet above sea level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
1. Cape Race	Fl. 7·5 ○ (·2 / 7·3)		165	19	Newfoundland: White tower, red lantern
2. Cape Pine	Gp. Fl. 9 ○—○—— (·1 ·1 / 1 6)		314	24	Newfoundland: White tower, red bands
3. Cape St. Mary	Gp. Fl. 30 ○—○—○—— (·4 ·4 ·4 / 2·6 2·6 23·6)		390	23	Newfoundland: Red tower

4. Galantry Head	Alt. Gp. Fl. 60 O—O—●— (8·4, 8·4, 8·4; 9·6, 12·6, 12·6)		210	18	St. Pierre (French): White semi-circular tower
5. Plate Point	Fl. 4 O— (1; 3)		154	18	Miquelon Is. (French): White tower, black bands
6. Cape Ray	Gp. Fl. 15 O—O—O— (3, 3, 9)		135	17	Newfoundland: White octagonal tower, red lantern
7. Cape Anguille	Gp. Fl. 10 O—O— (·5, ·5; 1·5, 7·5)		115	16	Newfoundland: Octagonal tower, red lantern
8. St. Paul Island, South Point	Gp. Fl. 12 O—O—O—O— (1·6, 1·6, 1·6, 7·2)	35,000	156	18	Cabot Strait: Red tower
9. Cape North	Fl. 5 O— (5)		110	16	Cape Breton Island: Red tower and lantern
10. Cape St. Lawrence	F O		137	17	Cape Breton Island: White tower, red lantern
11. Bird Rocks	Occ. 20 —O (15; 5)		152	18	Gulf of St. Lawrence: White hexagonal tower
12. Brion Island	Gp. Fl. 30 O—O—O—O— (5, 5, 5, 15)		126	17	Gulf of St. Lawrence: White tower, red lantern

Ports of Eastern Canada (*continued*)

Numbers on Map 1	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
13. *Anticosti*	F ○		60	13	Off Anticosti Island
14. Heath Point	Fl 7·5 ○ (·2) — (7·3)		130	17	Anticosti Island: White tower, red band and lantern
15. Bagot Bluff	F. Gp. Fl. 20 ○—○—— (10)	25,000	86	15	Anticosti Island: White tower, red lantern
16. South-West Point	F. Fl. 7 ○— (3·5)	25,000	94	15	Anticosti Island: White tower, two red bands
17. Cape Gaspé	F. Gp. Fl. 24 ○—○—— (12)	50,000	355	26	Quebec: White tower, red lantern
18. Cap des Rosiers	Occ. 20 —○ (15) (5)		136	17	Quebec: White stone tower
19. Fame Point	Gp. Fl. 10 ○—○—— (·5) (·5) (1·5) (7·5)		190	20	Quebec: Red tower and lantern
20. Cape Magdalen	Gp. Fl. 30 ○—○—○—— (·5) (·5) (·5) (5·5) (5·5) (17·5)		146	18	Quebec: White lantern, red cupola

21. West Point	F. O		106	16	Anticosti Island: White tower, two red stripes
22. Rivière à la Martre	Gp. Fl. 30 O(·5)—O(·5)—O(·5)—O(·5)—— (4·5, 4·5, 4·5, 14·5)		130	17	Quebec (mainland): Red tower
23. Cap Chat	Fl. 3 O(·2)—— (2·8)		120	17	Quebec (mainland): White tower, red lantern
24. Matane	Gp. Fl. 7·5 O(·5)—O(·5)—— (1, 5·5)		85	15	Quebec, River St. Lawrence: White tower, red lantern
25. Little Metis	Gp. Fl. 7·5 O(·2)—O(·2)—O(·2)—— (1·1, 1·1, 4·7)		79	14	Quebec, River St. Lawrence: Red lantern
26. Father Point	Gp. Fl. 7·5 O—O—O—O—— (4·3)		91	15	Quebec, River St. Lawrence: Octagonal tower, red lantern
27. Picquette Island	Fl. 3 O(·2)—— (2·8)		112	16	Quebec, River St. Lawrence: White tower, red lantern
28. Pointe des Monts	F. Gp. Fl. 20 O—O—O—— (10)	20,000	93	15	Quebec, River St. Lawrence: White tower
29. Seven Islands	F. Fl. 10 O—— (5)	50,000	190	20	Quebec, Gulf of St. Lawrence: White tower, red band

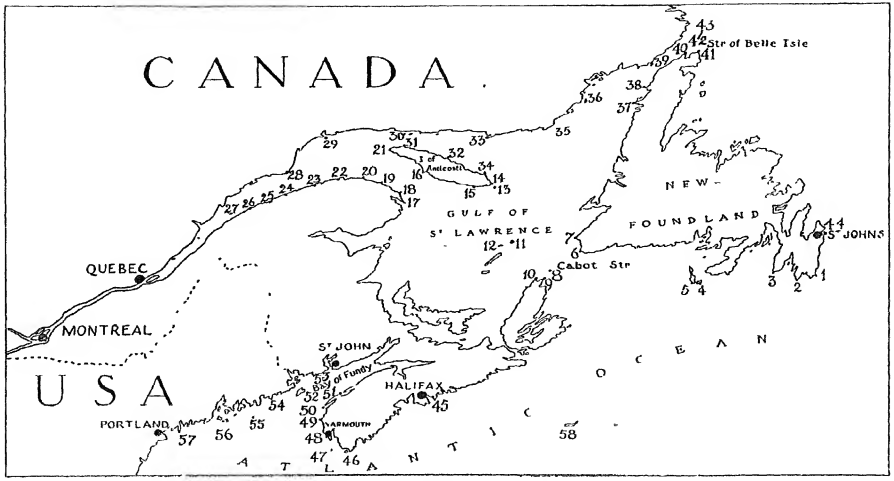
Ports of Eastern Canada (*continued*)

Numbers on Map 1	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in clear Weather	Location of Lighthouse and Characteristic Marks
30. Perroquet Island	F. Gp. Fl. 24 O—O—— 12	50,000	87	15	Quebec, Gulf of St. Lawrence: White tower, red lantern
31. Cap de Rabast	F. Gp. Fl. 24 O—O—O—— 12	40,000	78	14	Anticosti Island: White octagonal tower, red lantern
32. Charleton Point	F. Gp. Fl. 32 O—O—O—O—— 16	30,000	126	17	Anticosti Island: Red tower and lantern
33. Natashkwan Point	F. Gp. Fl 20 O—O—O—— 10	20,000	66	13	Quebec, Gulf of St. Lawrence: White tower, red lantern
34. Table Head	F. Gp. Fl. 20 O—O—— 10	50,000	112	16	Anticosti Island: White tower, red lantern
35. St Mary Islands	Gp. Fl. 15 O(·4)—O(·4)—— 1·9 12·3	25,000	114	16	Quebec, Gulf of St. Lawrence: White tower, red lantern
36. Flat Island	Gp. Fl. 9 O(·2)—O(·2)—O(·2)—— 1·3 1·3 5·8	15,000	72	14	Quebec, Gulf of St. Lawrence: White tower, red lantern

37. Rich Point	Gp. Fl. 5 ·2 ·2 O—O—— ·8 3·8		96	15	Newfoundland: White tower, red lantern
38. Férolle Point	Gp. Fl. 7·5 ·2 ·2 ·2 ·2 O—O—O—O—— ·8 ·8 8 4·3	40,000	91	15	Newfoundland: White tower, red lantern
39. Amour Point	Occ. 20 16 ——O 4		152	18	Labrador, Strait of Belle Isle: White tower
40. Cape Norman	Gp. Fl. 30 ·5 ·5 ·5 O—O—O—— 6 6 17·5		116	16	Newfoundland: White tower, red cupola
41. Cape Bauld	Gp. Fl. 15 ·5 ·5 O—O—— 2 12		187	20	Newfoundland: White tower, red cupola
42. South Point	Occ. 10 5 —O 5		470	28	Belle Isle: White tower
43. North Point	Fl. 11 ·5 O—— 10·5		137	17	Belle Isle: White tower, Red lantern
44. Cape Spear	Gp. Fl. 15 ·4 ·4 ·4 O—O—O—— 2·6 2 6 8 6		264	22	Newfoundland: Leading light for St. John's
45. Chebucto Head	Gp. Fl. 20 O—O—— 5 15	20,000	132	17	Nova Scotia: Square white tower. Entrance to Halifax Harbour

Ports of Eastern Canada (*continued*)

Numbers on Map 1	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
46. Cape Sable	Fl. 5 ·3 O —— 4·7		97	15	Nova Scotia: White tower, red lantern
47. Seal Island	Gp. Fl. 15 O—O—O—— 3 3 9		102	16	Nova Scotia: White tower, 2 red bands
48. Cape Fourchu	Fl. 2·5 ·2 O —— 2·3		121	17	Nova Scotia: White tower, red stripes. Approach to Yarmouth Harbour
49. Cape St. Mary	F. Gp. Fl. 24 O—O—— 12	50,000	103	16	Nova Scotia: White tower, red lantern
50. Brier Island	Gp. Fl. 15 O—O—O—O—— 2 2 2 9	50,000	92	15	Bay of Fundy: White tower, 3 red bands
51. Point Prim	F. Fl. 7 O—— 3·5	20,000	76	13	Entrance to Annapolis Basin: White tower, red stripes

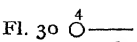
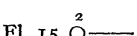
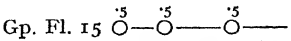
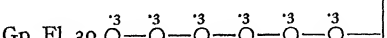
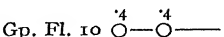
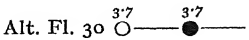

CANADA
USA
Str of Belle Isle
NEW-
FOUNDLAND
ST JOHN'S
GULF OF
ST LAWRENCE
I. of Anticosti
QUEBEC
MONTREAL
Cabot Str
ST JOHN
B. of Fundy
HALIFAX
YARMOUTH
PORTLAND
ATLANTIC
OCEAN

MAP 1

Ports of Eastern Canada (*continued*)

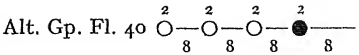
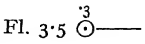
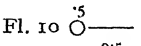
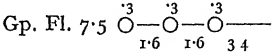
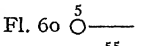
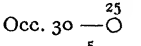
Numbers on Map 1	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
52. South-west Head	F Gp. Fl. 30 O—O—O—— (15)	20,000	200	20	Grand Manan Island: Square white tower
52. Swallow Tail	Occ. 6 —O (4, 2)		148	18	Grand Manan Island (north-east end): White octagonal tower
53. Lepreau Point	F. Gp. Fl. 24 O—O—O—— (12)	40,000	80	14	New Brunswick: White tower, red bands Approach to St. John Harbour
58. Sable Island (East end)	Gp. Fl 18 O—O—— (3, 15)		123	17	Nova Scotia: White and brown tower, red lantern
58. Sable Island (West end)	Fl. 5 O—		110	16	Nova Scotia: White framework tower, red lantern

For numbers 54–57 see under U.S.A. lights.

54. Moose Peak	Fl. 30 	110,000	72	14	Maine: White tower
55. Mount Desert Rock	Fl. 15 	24,000	75	14	Maine: Grey conical tower
56. Matinicus Rock	Gp. Fl. 15 	43,000	90	15	Maine: Grey tower
57. Seguin Island	F.	22,000	180	19	Maine: White tower
Numbers on Map 2					
1. Cape Elizabeth	Gp. Fl. 30 	500,000	129	17	Maine: White conical tower
2. Whaleback	Gp. Fl. 10 	37,000	59	13	New Hampshire: Grey conical tower
3. Isles of Shoals	Alt. Fl. 30 	60,000	82	14	New Hampshire: White conical tower
4. Cape Ann	F.	22,000	162	19	Massachusetts: Grey tower

U.S.A. Eastern Seaboard to Cape Lookout (*continued*)

Numbers on Map 2	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
5. Gloucester Harbour	Fl. 5 (1) — 4	30,000	57	13	Massachusetts: White conical tower
6. Graves	Gp. Fl. 6 (·2) — 1·3 — (·2) — 4 3	380,000	98	15	Massachusetts: Grey conical tower
Boston [1]	Fl. 30 (8) — 22	100,000			Massachusetts: Little Brewster Island
7. Cape Cod	Fl. 5 (·2) — 4 8	580,000	183	19	Massachusetts: White tower
8. Nauset Beach	Gp. Fl. 10 (·2) — 1 4 — (·2) — 1·4 — (·2) — 6 6	25,000	114	16	Massachusetts: White conical tower
9. *Nantucket Shoals* [2]	Occ 15 — 3 — (12)	3,000	65	13	Off Nantucket Island
10. Sankaty Head	F. Fl. 60 —	99,000	166	19	Massachusetts: White tower, red band

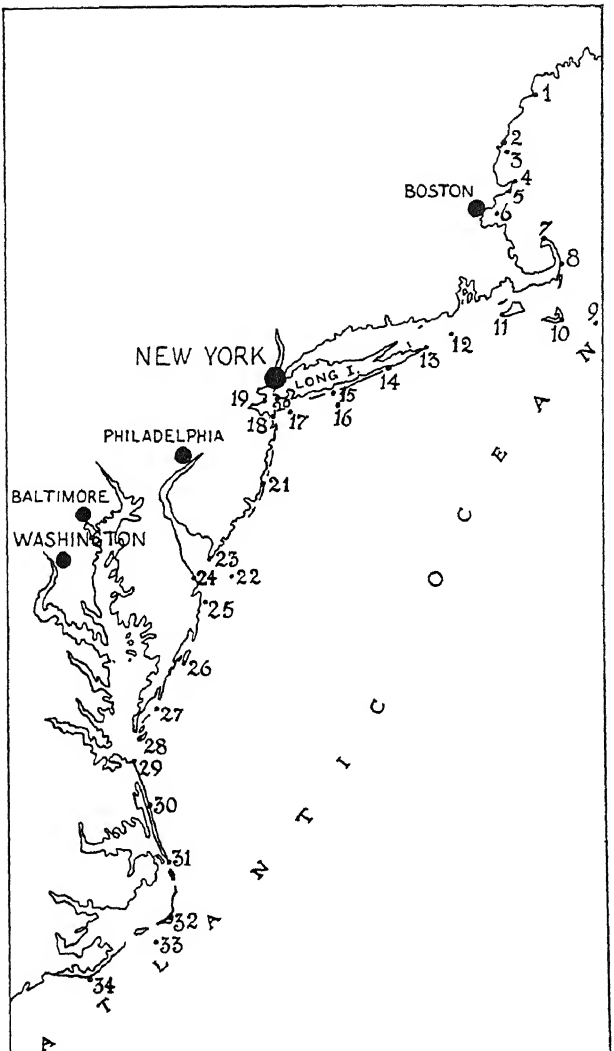
11. Gay Head	Alt. Gp. Fl. 40 	80,000	170	19	Massachusetts: Red tower
12. Block Island South-East	Fl. 3·5 	50,000	201	20	Rhode Island: Red brick octagonal, pyramidal tower
13. Montauk Point	Fl. 10 	130,000	168	19	Long Island, N.Y.: White octagonal, pyramidal tower, brown band
14. Shinnecock Bay	Gp. Fl. 7·5 	350,000	160	18	Long Island, N.Y.: Red brick tower
15. Fire Island [2]	Fl. 60 	170,000	167	19	Long Island, N.Y.: White tower, black bands
16. *Fire Island*	Occ. 30 	3,000	57	12	

[1] The Boston light, on Little Brewster Island is the oldest light in the United States. It was originally built in 1716 in the reign of George I. at a cost of £2285 17s. 8½d. It was then lit by candles. During the War of Independence it suffered destruction more than once by British and American forces and was rebuilt for the third time in 1783.

[2] Either Nantucket or Fire Island is the outpost light of the American Continent on the route between New York and Europe.

U.S.A. Eastern Seaboard to Cape Lookout (*continued*)

Numbers on Map 2	Character of Light Figures in Seconds		Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
17. *Ambrose Channel*	Occ. 15 — O (12 / 3)	Entrance to New York Harbour	5,000	65	13	
18. Navesink	Fl. 5 O (·3 / 4·7)		710,000	246	22	New Jersey: Two towers
19. Staten Island	F. O		350,000	231	21	New Jersey: Octagonal tower, grey base
20. Coney Island	Fl. 5 O (·8 / 4·2)		54,000	75	14	Long Island, N.Y.: White framework tower
21. Barnegat	Fl. 10 O (2·5 / 7·5)		11,000	175	19	New Jersey: White tower, upper half red
22. *Five Fathom Bank*	Occ. 6 — O (4 / 2)		15,000	65	13	Off Delaware Bay. For Philadelphia
23. Cape May	Fl. 30 O (5 / 25)		130,000	165	19	New Jersey: Grey tower, red lantern


BOSTON
NEW YORK
LONG I.
PHILADELPHIA
BALTIMORE
WASHINGTON
ATLANTIC OCEAN
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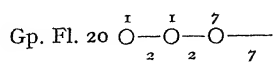
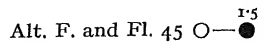
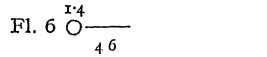
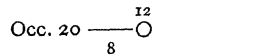
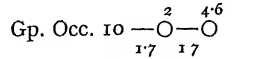
MAP 2

U.S.A. Eastern Seaboard to Cape Lookout (*continued*)

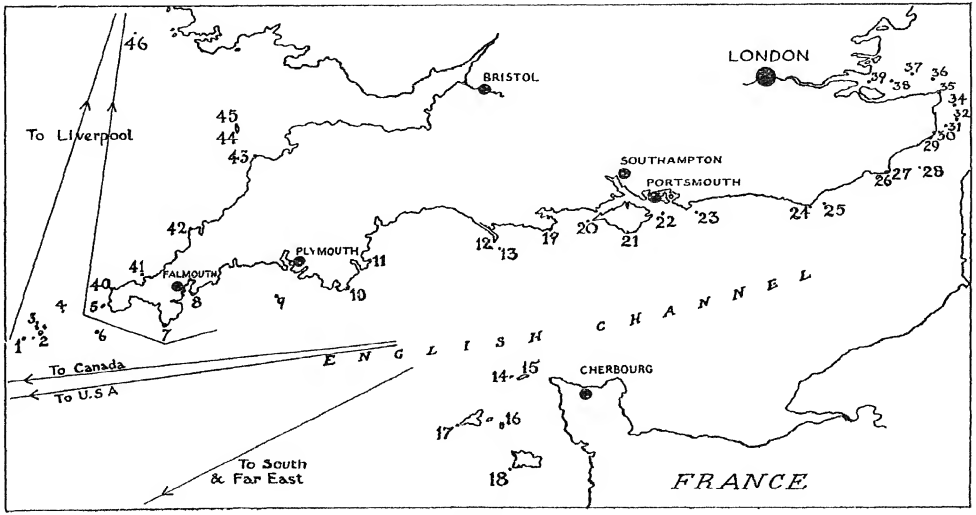
Numbers on Map 2	Character of Light Figures in Seconds	Candle-power	Height in Feet above sea level	Distance Visible in clear Weather	Locarion of Lighthouse and Characteristic Marks
24. *Overfalls*	Occ. 15 — O (10 / 5)	3,000	50	12	Delaware Bay
25. Fenwick Island	Occ. 60 — O (50 / 10)	12,000	83	14	On boundary between Delaware and Maryland: White tower
26. Assateague	F. O	22,000	154	18	Virginia: Red tower
27. Hog Island	Fl. 45 O—— (3·5 / 41·5)	280,000	180	19	Virginia: Black framework tower
28. Cape Charles	Gp. Fl. 60 O—O—O—O—O—— (1·2 1·2 1·2 1·2 / 2·5 2 5 2·5 6·7) O—O—O—O—O—O—— (1·2 1·2 1·2 1·2 1·2 / 2·5 2 5 2 5 2·5 25)	130,000	180	19	Virginia: White framework tower. Entrance to Chesapeake Bay. For Washington and Baltimore

29. Cape Henry	Gp. Fl. 20 	80,000	157	18	Virginia: Black and white octagonal tower
30. Currituck Beach	Alt. F. and Fl. 45 	22,000	158	18	North Carolina: Red conical tower
31. Bodie Island	F.	22,000	156	18	North Carolina: White tower, black bands
32. Cape Hatteras	Fl. 6 	80,000	191	20	North Carolina: Black tower, white spiral bands
33. *Diamond Shoal*	Occ. 20 	5,500	65	13	
34. Cape Lookout	Gp. Occ. 10 	77,000	156	18	North Carolina: White tower, black chequers

Numbers on Map 3	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
1. Bishop Rock	Gp. Fl. 15 ·7 O — ·7 O — 1·6 12	622,000	143	18	Scilly Isles. Grey granite tower
2. Penninis	Fl. 20 ·5 O — 19·5	100,000	110	16	Scilly Isles: White iron tower
3. Round Island	Fl. 30 1·7 O — 28·3	415,000	180	19	Scilly Isles: White tower Wireless beacon
4. *Seven Stones*	Gp. Fl. 1 min. 3·5 O — 3·5 O — 3·5 O — 6·5 6·5 36·5	12,000	38	11	Cornish coast.
5. Longships	Occ. 1 min. — 5·7 O 3	35,000	110	16	Cornish coast: Grey granite tower
6. Wolf Rock	Alt. Fl. 30 2 O — 2 ● — 13 13	70,000	110	16	Cornish coast· Grey tower, black lantern

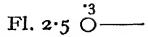
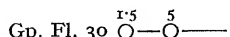
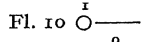
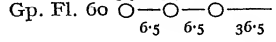
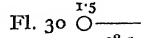
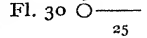
7. **LIZARD**	Fl. 3 ·1 O —— 2·9	3,000,000	230	21	Cornish coast: White octagonal tower
8. St. Anthony	Occ. 20 — 17 O 3	20,000	72	14	Cornish coast: White octagonal tower
9. Eddystone	Gp. Fl. 30 1 O — 1 O —— 5·5 22·5	292,000	133	17	Devon coast: Grey granite tower, red lantern
10. Start Point	Fl. 20 1·5 O —— 18·5	274,000	204	20	Devon coast: White tower
11. Berry Head	Gp. Fl. 15 ·3 O — ·3 O —— 2·5 11·9	45,000	191	20	Devon coast: White tower
12. Portland	Gp. Fl. 20 ·2 O — ·2 O — ·2 O — ·2 O —— 1·3 1·3 1 3 15·3	256,000	141	18	Dorset coast: White tower, red band
13. *Shambles*	Gp. Fl. 30 5 O — 1 5 O —— 6 17 5	8,000	38	11	Dorset coast
14. Casquets	Gp. Fl. 30 1·2 O — 1·2 O — 1·2 O —— 3 8 3 8 18 8	184,000	120	17	Channel Islands (Brit.): White tower
15. Alderney	Gp. Fl. 15 ·2 O — ·2 O — ·2 O — ·2 O —— 2·1 2·1 2·1 7·9	400,000	121	17	Channel Islands (Brit.): White tower, black band

Numbers on Map 3	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
16. Sark	Fl. 15 O (1 / 14)	92,000	213	21	Channel Islands (Brit.): White octagonal tower
17. Les Hanois	Fl. 45 O (9 / 36)	74,000	100	16	Channel Islands (Brit.): Grey granite tower, black lantern
18. La Corbière	F. O	29,000	119	17	Channel Islands (Brit.): Grey tower. White and red sectors
19. Anvil Point	Fl. 10 O (1·4 / 8·6)	74,500	149	18	Dorset coast: White tower
20. Needles	Gp. Occ. 20 — O (2) — O (14) (2)	35,000	80	14	Isle of Wight: Granite tower, black band and lantern. White, green, and red sectors
21. St. Catherine	Fl. 5 O (·2 / 4·8)		136	17	Isle of Wight: White octagonal, castellated tower
22. Nab	Fl. 10 O (1 / 9)	12,000	105	16	Spithead channel: Concrete and steel tower

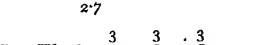
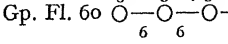
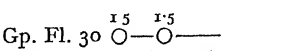
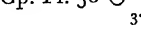
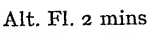

LONDON
BRISTOL
To Liverpool
SOUTHAMPTON
PORTSMOUTH
PLYMOUTH
FALMOUTH
ENGLISH CHANNEL
To Canada
To U.S.A
CHERBOURG
To South
& Far East
FRANCE

MAP 3

Numbers on Map 3	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
23. *Owers*	Alt. Fl. 60 3·5 — 26·5 — 3·5 — 26·5	8,000	38	11	Sussex coast
24. Beachy Head	Gp. Fl. 20 ·7 — 2 6 — ·7 — 16	274,000	103	16	Sussex coast: Grey tower, black band and lantern
25. *Royal Sovereign*	Fl. 30 2 5 — 27·5	750,000	39	11	Sussex coast
26. Dungeness—1	Fl. 10 1·3 — 8 7	164,000	130	17	Kent coast: Black tower white band and lantern. Wireless beacon
27. Dungeness—2	Fl. 5 2 — 3	11,000	38	11	Kent coast: White tower
28. *Varne Shoal*	Fl. 20 2·3 — 17·7	5,000	36	11	Kent coast
29. Dover	Fl. 7·5 1 — 6·5	100,000	70	14	Kent coast: White tower

30. **SOUTH FORELAND**	Fl. 2·5 	1,000,000	374	26	Kent coast: White, square castellated tower
31. *South Goodwin*	Gp. Fl. 30 	8,000	36	11	Goodwin Sands
32. *East Goodwin*	Fl. 10 	20,000	40	11	Goodwin Sands
34. *North Goodwin*	Gp. Fl. 60 	12,000	40	11	Goodwin Sands: Triangle at masthead
35. North Foreland	Occ. 30 	35,000	188	20	Kent coast: White octagonal tower. Wireless beacon
36. *Tongue*	Alt. Gp. Fl. 30 	8,000	40	11	Kent coast
37. *Edinburgh*	Fl. 5 	2,500	35	10	Kent coast
38. *Girdler*	Fl. 30 	275,000	32	10	Kent coast
39. *Nore*	Fl. 30	2,000	35	11	Kent coast

Numbers on Map 4	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
62. Fastnet Rock	Fl. 5 ·2 O —— 4·8	750,000	160	18	County Cork: Grey granite tower
63. Galley Head	Gp. Fl. 20 O — O — O — O — O —— 2·5 2·5 2·5 2·5 10	300,000	174	19	County Cork: White tower
64. Old Head of Kinsale	Gp. Fl. 10 ·2 O — ·2 O —— 1·6 8	460,000	236	21	County Cork: White tower, 2 red bands
65. *Daunt Rock*	Fl. 30 3 O —— 27	28,000	38	11	County Cork
66. Ballycotton	Fl. 10 ·7 O —— 9·3	160,000	195	20	County Cork: Black tower
67. Minehead	Gp. Fl 20 ·2 O — ·2 O — 2 O — ·2 O —— 2 3 2 3 2 3 12·3	230,000	285	23	County Waterford: Plain tower

68. Hook Point	Fl. 3 	279,000	152	18	County Wexford: White tower, 3 red bands and red lantern
69. *Coningberg*	Gp. Fl. 60 	90,000	38	11	County Wexford
70. *Barrels Rock*	Gp. Fl. 30 	28,000	38	11	County Wexford
71. Tuskar Rock	Alt. Fl. 2 mins 	340,000	108	16	County Wexford: White tower
72. Eeragh Island	Fl. 60  Entrance to Galway Bay	200,000	115	16	Aran Islands: White tower, 2 red bands
73. Inisheer	Occ. 20  Entrance to Galway Bay	40,000	110	15	Aran Islands: White tower, 1 red band
Numbers on Map 3					
40. **PENDEEN** [1]	Gp. Fl. 15 	2,000,000	195	20	Cornwall: White tower

[1] The lights from Pendeen to Bardsey Island are only visible on the routes to Liverpool from South, Far East, and coastwise.

Atlantic to Liverpool (south about) (*continued*)

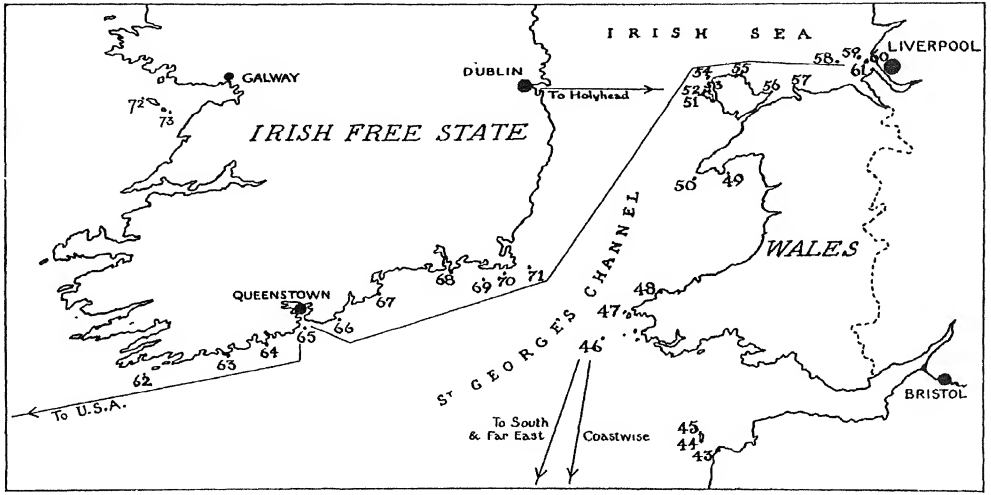
Numbers on Map 3	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
41. Godrevy	Fl. 10 (2 — 8)	68,000	120	17	Cornwall: Octagonal tower
42. Trevose Head	Fl. 5 (·3 — 4·7)	248,000	204	20	Cornwall: White towe
43 **HARTLAND POINT**	Gp. Fl. 15 (·1 — 1·4 — ·1 — 1·4 — ·1 — 1·4 — ·1 — 1·4 — ·1 — 1·4 — ·1 — 7·4)	1,250,000	120	17	Devonshire. White tower
44. South Lundy Is.	Fl. 30 (4 — 26)	206,000	175	19	Devonshire: White tower
45. North Lundy Is.	Gp. Fl. 20 (·5 — 2 — ·5 — 2 — 16·8)	374,000	165	19	Devonshire: White tower. Wireless beacon
46. The Smalls	Gp. Fl. 15 (·2 — 2·4 — ·2 — 2·4 — ·2 — 9·6)	477,000	126	17	Entrance to Bristo Channel: White tower red bands

Numbers on Map 4					
47. South Bishop	Fl. 20 $\overset{1.5}{O}$ —— 18.5	129,000	144	18	Pembrokeshire: White tower. Wireless beacon
48. Strumble Head	Gp. Fl. 15 $\overset{.2}{O}$—$\overset{.2}{O}$—$\overset{.2}{O}$—$\overset{.2}{O}$ —— $2.1\quad 2.1\quad 2.1\quad 7.9$	400,000	148	18	Pembrokeshire: White tower
49. St. Tudwall's Isle	Fl. 20 $\overset{1}{O}$ —— 19	12,000	151	18	Carnarvonshire: White tower
50. Bardsey Island	Gp. Fl. 15 $\overset{.2}{O}$—$\overset{.2}{O}$—$\overset{2}{O}$—$\overset{2}{O}$—$\overset{.2}{O}$ —— $1.7\quad 1.7\quad 1.7\quad 1.7\quad 7.2$	270,000	129	17	Carnarvonshire: Square white tower, 2 red bands
51. South Stack	Fl. 10 $\overset{.7}{O}$ —— 9.3	274,000	197	20	Isle of Anglesey: White tower
52. North Stack	Fog signals only				Isle of Anglesey: White rectangular house
53. Holyhead [1] Breakwater	Fl. 7.5 $\overset{.7}{\bullet}$ —— 6.8	31,000	70	14	Isle of Anglesey: Square white tower, black band
54. **SKERRIES**	Gp. Fl. 10 $\overset{.2}{O}$—$\overset{.2}{O}$ —— $2.1\quad 7.5$	4,000,000	119	17	Isle of Anglesey: White tower, red band. Wireless beacon

[1] Holyhead to Dublin, principal route to Ireland.

Numbers on Map 4	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
55. Point Lynas [1]	Occ. 10 ——○ (2)	10,000	128	16	Isle of Anglesey: White castellated tower
56. Penmon Point	Fl. 5·5 ○—— (·5 / 5)	15,000	61	13	Isle of Anglesey: White tower, 3 black bands
57. Great Orme's Head	Gp. Fl. 30 ○—○—○—○—— (6 2 / 2 5 · 1·2 / 2 5 · 1·2 / 2 5 · 1·2 / 12 7)	13,000	324	24	Carnarvonshire: Square white castellated tower
58. *Mersey Bar*	Gp. Fl. 30 ○—○—○—— (2 / 2 · 2 / 2 · 2 / 20)	40,000	30	10	Liverpool Bay
59. *Formby*	Fl 20 ○—— (2 / 18)	4,000	48	8	Liverpool Bay
60. *Crosby*	Fl. 10 ○—— (1 / 9)	4,000	30	10	Liverpool Bay
61. Rock Lighthouse	Fl. 20 ○—— (5 / 15)	8,000	63	13	Cheshire coast: Granite tower

[1] At Point Lynas the Liverpool pilot is taken up. He comes in a small boat from the pilot steamer which cruises off the Point in all weathers. Along this coast-line the mountain-chain visible in clear weather is the Snowdon Range, principal peak 3,560 ft.


IRISH SEA
LIVERPOOL
GALWAY
DUBLIN
To Holyhead
IRISH FREE STATE
WALES
ST GEORGE'S CHANNEL
QUEENSTOWN
BRISTOL
To U.S.A.
To South & Far East
Coastwise

MAP 4

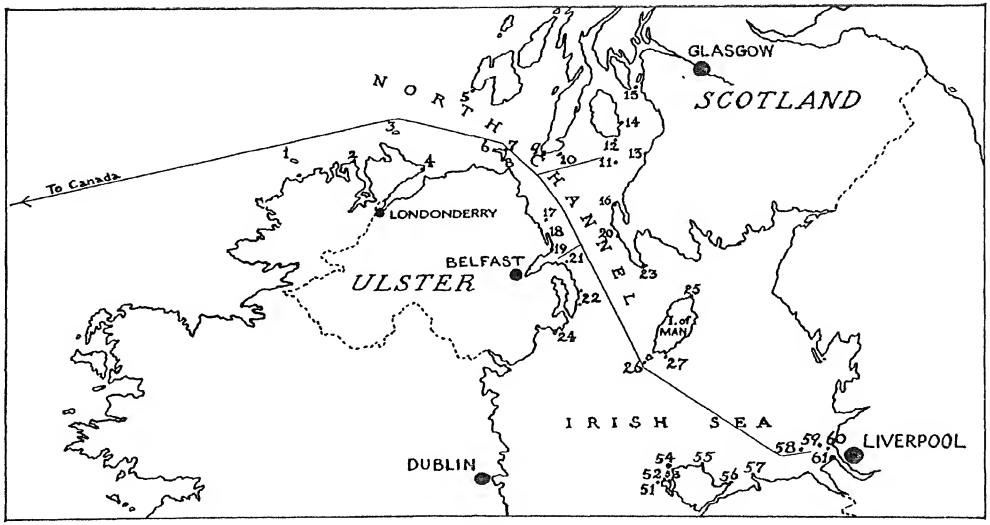
Numbers on Map 5	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
1. **TORY ISLAND**	Gp. Fl. 30 ·2 O — ·2 O — 2 O — ·2 O — 4·8 1·8 4 8 14·8	1,500,000	130	17	County Donegal: Black tower
2. Fanad Head	Gp. Fl. 15 O — O — O — O — O — O — 1 1 1 1 1 7	57,000	127	17	County Donegal: White tower. Entrance to Lough Swilly
3. Inishtrahull	Fl. 30 2 O — 28	200,000	181	19	County Donegal: White tower
4. Inishowen Head	F. O	8,000	67	13	County Donegal: White tower, black band. Entrance to Lough Foyle, for Londonderry
5. Rhinns of Islay	Fl. 5 ·5 O — 4·5	233,000	150	18	Inner Hebrides
6. West Rathlin [1]	Fl. 5 ·3 O — 4·7	250,000	204	20	Rathlin Island [1]

7. East Rathlin [1]	Gp. Fl. 20 ·2 ·2 ·2 ·2 O—O—O—O—O—— (2·3, 2 3, 2·3, 12·3)	230,000	243	22	Rathlin Island: White tower, red band
8. Rue Point	Gp. Fl. 5 ·5 ·5 O—O—— (·5, 3·5)	1000	52	12	Rathlin Island: White tower, black bands
9. Mull of Cantyre	Gp. Fl. 30 ·5 ·5 O—O—— (4, 25)	281,000	297	24	Argyllshire: White tower
10. Sanda	Fl. 24 8 O—— (16)	61,000	165	18	Isle of Bute: White tower
11. Ailsa Craig	Gp. Fl. 30 ·5 ·5 ·5 ·5 ·5 ·5 O—O—O—O—O—O—O—— (2, 2, 2, 2, 2, 17)	40,000	60	13	Firth of Clyde: Yellow brick tower
12. **PLADDA**	Gp. Fl. 30 ·5 ·5 ·5 O—O—O—— (3, 3, 22·5)	1,000,000	130	17	Firth of Clyde: White tower
13. Turnberry Head	Fl. 12 2 O—— (10)	6,000	96	15	Firth of Clyde: White tower
14. Holy Island	Alt. Fl. 30 1 1 O——●—— (14, 14)	392,000	124	17	Firth of Clyde. Square white tower

[1] Rathlin Island is situated off the Antrim coast. The great cliff on the mainland at the corner where the Irish Sea joins the Atlantic is Fair Head. It is composed of basaltic columns similar to the formation at the Giant's Causeway. In clear weather the coast of Scotland can be seen stretching as far north as the Paps of Jura, two conical shaped hills on the north horizon.

Atlantic to Liverpool (north about) *continued*

Numbers on Map 5	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
15. Little Cumbrae Island	Gp. Fl. 30 O(1)—O(1)—— (3, 25)	158,000	115	16	Firth of Clyde: White tower
16. Corsewall Point	Alt. Fl. 74 O(11)——O(11)—— (26, 26)	95,000	112	16	Wigtownshire: White tower
17. The Maidens	Gp. Fl 20 O(·5)—O(·5)—O(·5)—— (2·8, 2·8, 12·9)	270,000	95	15	County Antrim· White tower, red band
18. Larne Harbour	Occ. 5 —O(3) (2)	1000	75	14	County Antrim: Irish round tower (modern)
19. Black Head	Fl. 3 O(·5)—— (2·5)	165,000	148	18	County Antrim: Red octagonal tower. Entrance to Belfast Lough
20. Killantringan	Gp. Fl. 30 O(·5)—O(5)—— (4, 25)	840,000	160	19	Wigtownshire: White tower
21. Mew Island	Gp. Fl. 30 O(·2)—O(·2)—O(·2)—O(·2)—— (4·8, 4·8, 4·8, 14·8)	177,000	121	17	County Down: Black tower


GLASGOW
SCOTLAND
NORTH CHANNEL
To Canada
LONDONDERRY
BELFAST
ULSTER
I. of MAN
IRISH SEA
LIVERPOOL
DUBLIN
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MAP 5

Atlantic to Liverpool (north about) *continued*

Numbers on Map 5	Character of Light Figures in Seconds	Candle-power	Height in Feet above Sea Level	Distance Visible in Clear Weather	Location of Lighthouse and Characteristic Marks
22. *Skulmartin*	Fl. 60 6 / 54	28,000	38	11	Off County Down
22. *South Rock*	Gp. Fl. 45 2·5 — 2·5 / 5 — 35	12,000	38	11	Off County Down. Lies a little south of Skulmartin
23. Mull of Galloway	Occ. 22 5 — 15 / 7·5	29,000	325	25	Wigtownshire: White tower
24. Dundrum Bay	Gp. Fl. 7·5 ·1 — ·1 / 1·2 — 6·1	460,000	120	17	County Down: White tower, black bands
25. Point of Ayre	Alt. Fl. 60 8 — 8 / 22 — 22	66,000	106	16	Isle of Man: White, 2 red bands
26. Chicken Rock	Fl. 30 2·5 / 27·5	173,000	122	16	Isle of Man: Granite tower
27. Langness	Fl. 5 1 / 4	9000	76	14	Isle of Man: White tower

For numbers of lighthouses 51 to 61, see previous list.

CHAPTER X

THE MAGIC CIRCLE

THE only land left to be explored is the land that lies under the sea. But as the estimated area of this unknown territory is exactly three times that of the known land, we still have the comforting reflection that the superficial exploration of our globe is not yet even half complete. The sea is perhaps the only great mystery left to us, and as such it has a certain large value which we may as well enjoy while it lasts. One can still remember the unique mental thrill excited by reflections on the North Pole, and the intellectual joys of wondering and imagining what things and conditions *could* be like or *unlike* there. Then came Mr. Cook's not very exciting story, which proved to be a fraud, followed by a frankly dull story from Mr. Peary, which turned out to be true. But even if a Neanderthal man had been discovered sitting on the North Pole, in company with the straight-tusked elephant, the woolly rhinoceros, and the great auk, they could not have saved the catastrophe of reclaiming the North Pole from the unknown, and thereby robbing the whole world of a legitimate fiction play-ground.

Day in, day out, away from sight of land, the voyager finds himself retreating from, passing, and approaching horizons whose sameness on any other element but the sea would probably have the effect of causing mental exhaustion. But no matter how long a voyage is, very few people seem to get bored with the sea. The fact is, that the mystery of the unseen, beyond the dissolving horizon and beneath the keel, holds them with the magnetism of romance. They may be travelling to a foreign country for the sake of seeing strange things. But no country is so strange and opposite in all respects as that one immediately below them, on whose frontier they spend day and night, but can never hope to penetrate. Therefore it is, that when the inscrutability of the perpetual magic circle, of which the ship is the centre, breaks silence to reveal a single fish, there is something like a thrill among the beholding passengers.

Oceanography is the unwieldy and unattractive name under which the new and prolific science of submarine lore is being expounded. A popular, up-to-date book on the subject ought to be in every ship's library, and I have no intention of poaching on this very specialized preserve except to make a few general remarks on the usual and ordinary manifestations from the silent mer-kingdom that a ship is likely to fall in with.

That friendly buffoon, the porpoise, is a beast generally sighted in summer or southern cruising. He shares with the tortoise the misfortune of having

come into the zone of standardized spelling before the evolution of his orthography had caught up with the pronunciation of his name, which in his case, is por*pus* (and not por*poiz*), as in the other case it is tor*tus* (and not tor*toiz*). The grampus has been luckier. His name is derived from the old French *grand poisson*, but the Normans introduced him to us as granpoise, since when we have Englished him wholeheartedly into grampus. Similarly, the porpoise is the *porc poisson*, or pig-fish.

When you next see a porpoise, first make sure that he is not a dolphin, and vice versa. Sailors use these two words indiscriminately. The difference is to be observed about the snout. The porpoise is snub-nosed, the dolphin bottle-nosed. The porpoise seldom makes his appearance otherwise than with his famous rolling motion, plunging all or partly out and in with a curving rollick. The dolphin will leap bodily out and up, as much as ten feet above the surface, and is often to be seen by the bows, shooting along at a level distance below the surface, like a torpedo. By the bows also, when the sun is behind your back, you will often see graceful periodic rainbows, caused by the sunlight on the fine spray from the stem. These rainbows are held by many old sailors to be dolphins swimming in the depths. And this idea is no doubt connected with the superstition that a dolphin on the approach of death turns all colours of the rainbow. Unlike many sea-monster superstitions of the same kind, the mistake is only one of degree, confusing

the dolphin with the Portuguese fish *doradeo*, which actually does undergo these changes when dying.

But sailors will not be refuted on the rainbow question, and it is natural, as they have a proprietary interest in dolphins. The sailor and the dolphin have had friendly relations as long as the sea has been mentioned in literature. The creature was the favourite of Apollo, and appropriately worshipped at Delphi, while the great sailor hero of the Odyssey is reported to have had a dolphin embossed on his shield. And to-day this fish has the honour of being the badge of the latest and most formidable arm of the navy, the submarine service, which demands of the individual man all that courage, enterprise, ability, and restraint which went behind the shield of Odysseus.

If anatomy makes the fish, then the dolphin, together with the rest of the whale tribe, must be denied fish-hood. Scientists and pedants prefer that we should call them mammals—wild beasts in fact! But painters, engravers, sculptors, and heralds have pointed out the dolphin as the soul of the fish idea. And the poets, the inventors of language, have aided and abetted them for thousands of years. Let the scientists stick to their Latin and cease to violate the vulgar tongue! The ideas that mere words give us are lamps unto our feet, and it is doubtful if we should ever set out on a walking tour if the categorists compelled us to describe it as a "projection of the ego by plantigrade progression."

One may fall in with whales in either the cold or

the warm seas. They are, of course, quite unmistakable when sighted. They may be seen blowing, cruising on the surface, or leaping bodily out of the sea to rid themselves of parasites. To give clues as to which kind of whale it is that you see would be beyond the scope of this book. In any case, they are generally objects which you *sight* rather than see.

Going from England to the Canary Islands (Lat. 28° N.) you will be lucky if you see a flying-fish, though a voyage to any port south of Las Palmas is sure to give you a glimpse of these delightful creatures. The wing of the flying-fish is one of the regulation *curios* of the sailor. It belonged, with the Gulf-weed-and-Calvary-in-spirits, to the first spell of glamour in the ages of a sailor-man, as the ship-in-bottle belonged to the last. And now that the sailing-ship, with her tragic but vital glory, has stolen from the sea, the flying-fish claims our special attention as something that catches the reflected light of an old romance.

There are two kinds of flying-fish, one a species of gurnard, the other a kind of herring. The former is rare, and is generally seen only singly. The design of his wings is carried out by Nature compatibly with the striking motif of angularity which distinguishes the ordinary gurnard fish. The wings are of the true dragon variety, with curving spines protruding beyond the aileron membrane. But it is the other fish, with the round, smooth-margined, pearly wings, that is the hero of fiction and legend. It is said that he has no real power of flight, but flashes out of the sea with a

spring from his tail, glides in the air for a distance varying from a few feet to a hundred yards, and generally makes a bad landing, flopping on his belly with a splash, which indicates that he has not the necessary flight-control to return to the water with a clean header. Flying-fish have greater speed against the wind than with it, and when they fly against the direction of wind and wave, they follow the undulating contour, buoyed up by the pressure of the disturbed air, and let down again into the lee of the wave's trough. The flight is taken from motives of fear rather than pleasure. The swoop of the ship's fore-foot, and the loom of her shadow, bring up the flying-fish. And the fact that they are nearly always seen to go in the same direction as the vessel, and parallel to it, indicates that once they have chosen a direction and made their spring into the air they have to complete their glide and have no power of aerial steering. Sometimes they fall on board of steamers, but this happened much more frequently in sailing-ships, as they had a lower freeboard. If they can be secured for the pot, they make very good eating.

The shark family is probably the most conspicuously ugly family in the world. It seems to have a particular genius in this direction, which is cultivated assiduously by every member of every branch. The shark's relations include the dog-fish, the saw-fish, the torpedo ray (which can give off an electric shock powerful enough to paralyse the muscles for hours), and all the other rays and skates with their many and

varied horrific qualities. Few people are proof against the involuntary thrill of horror at their first sight of that smooth dorsal fin raised above the surface, cruising with the slow deliberation of pitiless expectancy. Indeed it would seem that there might be something more deep-seated in man's aversion to the shark tribe than mere appearances and knowledge of danger would warrant, for fishermen, on catching numbers of dog-fish, show a most unbalanced vindictiveness, giving vent to paroxysms of furious vengefulness that nothing but a primal passion of disgust could account for.

The most pleasant feature of the shark is his inseparable friendship with a small, harmless, and even beautiful little fish, which from the nature of his association is called the pilot-fish.

The only other marine creature that a voyager is tolerably likely to fall in with, is the turtle. Quite far out to sea he will sometimes be passed, and will allow the ship to go as near him as a matter of feet. If he is on a parallel course himself, and dives in full view, the dissolution of his motley image in the deeps, with all his flippers going, is one of the pretty sights of the sea. It is the green turtle that yields the sumptuous soup, and the hawk's-bill turtle the tortoiseshell.

A hint as to what sea fish may pick up from ships without impairing their digestions, may be gathered from an old newspaper-cutting I have by me. "The knife had been used on board the Norwegian steamship *Fædrelaudet* to cut the pages of two books when

the vessel was about a hundred and forty sea miles north-west of Hull, bound for Cronstadt; an unexpected wave caused the user of the knife to leave his deck-chair and take shelter in the cabin. It is believed that the knife was then dropped upon the deck, and that the wave swept the knife over through a scupper-hole. This happened on 6 August, 1898, and the knife was not seen again until May 1911, that is an interval of twelve and three-quarter years; it was then found embedded in the flesh of a silver hake, which was being decapitated in Manchester Fish Market. The fish from which the knife was recovered was one of a consignment landed at Fleetwood. The knife, therefore, which was lost on the eastern side of England, was recovered from the Irish Sea."

One can see the light of speculative imagination dawning in that Manchester fish-gutter's expression, when he handled the knife and thought to himself: "Now, I wonder who in the great wide world this belonged to!" But on closer inspection, the knife itself made no secret of this. It belonged to Mr. R. W. Mason, a Manchester man, and the shop where it had been purchased was within a penny tram-ride of the fish-market. And those who smile at this happy conclusion and call up comparisons with Jonah and other big fish stories, I would respectfully refer to the office of that very reputable paper, the *Field*, which, I believe, verified all the particulars at the time. It is really true.

But I suppose I shall not help out the case for my

last sentence if I confess openly that I am a believer in the sea-serpent. I have never heard any one else make such an unblushing admission, though I think at the present day there are those to be found who would go almost as far. Fifty years ago a belief in the sea-serpent was shared only by sailors and that class of landsman who had no connection with the intelligentsia, while the stunt-press made notorious capital out of the monster in the "silly season." To-day the position is reversed. The modern sailor, and that landsman above referred to, will, at the mention of the sea-serpent, begin to expound laboriously how the belief arose: (*a*) from a wonderful coincidence of porpoises in column of perspective, which timed their rolling so that their bodies were seen curved above the surface at the same moment, giving the appearance of a gigantic corkscrew awash; (*b*) a wavy line of floating discharged ashes, with an empty cask at the end of it; (*c*) a boiling shoal of fish.

But the world of science has not yet recovered from the shocks which oceanographers gave it, when they began to explore, and produced creatures which had been definitely proved not to exist. A writhing tentacle of the giant squid, seen above the surface, had been used as an ingenious excuse for the deluded man who thought he saw a sea-serpent, until it was authoritatively written that the giant squid was also a myth, although a description of it came well enough from the pen of an imaginative writer. The truth being that although many such monsters had been

reported, none had been retrieved and laid under the spectacles of the august pronouncer.

Now, the Prince of Monaco, whose life was devoted to the sinking of gold flung down in the pools of Monte Carlo into the greater depths of the ocean, probably shared in the belief of his scientific colleagues. But, to quote from Sir William Herdman: "In 1895, while they were pursuing deep-sea research near the Azores, a native crew in their neighbourhood killed a sperm-whale which died under the bottom of the prince's yacht, having charged the ship in its death-agony as its apparent enemy. On floating up at the other side, it emitted from its widely opened mouth the remains of its last meal, which proved to be fragments of gigantic cuttle-fishes, hitherto unknown to science. . . . Another case reported is where a whale contained a single arm or tentacle, which 'though incomplete from having been partly digested, still measured twenty-seven feet in length,' and this seems to justify the common saying of the sailors that 'the squids are the biggest fish in the sea.' "

Poor sailors, what tardy justice to their truthful lips! This glimpse of what a whale could do was not lost on the prince. He immediately converted his yacht into a whaler, and on the principle of the Chinaman who uses a cormorant to catch fish, he went whaling to secure specimens of giant squids, and succeeded. A whale, protected by his enormous walls of bone and blubber, is able to perform that familiar evolution known in whaling circles as *sounding*. By

this is meant that the great beast goes headlong down to immense depths in which other surface fish would be crushed by water-pressure. And in these chill, dim deeps, even below the reach of sunlight, he hunts for food which never swims aloft into the warmer upper waters. What else lives in the abysses that the fishing-tackle of oceanographers fails to lure, and is too big for even a whale to devour?

In the days of Queen Victoria, the reports of the sea-serpent were quite numerous, and it has naturally been taken for granted that as the light of science dawned, and the sailing-ship with its superstitious crew was replaced by the steamer, with its better-educated officers and intelligent passengers, the reports of the sea-serpent would grow less and less, and cease altogether. That is exactly what has occurred. Nevertheless, it is quite probable that the coming of steam coincided with the disappearance of the last of the titanic brood from the under-seas, or it is possible that he is accommodating himself to lower regions still, and makes fewer and fewer visits to the surface. Certain fish and molluscs which the Victorian zoologist mourned as having passed from their department to that of the geologic ages before man, have now been found living, comfortably settled down to the conditions of greater depth and hydrostatic pressure. And knowing the increasing difficulties of life on the surface of our planet, we cannot blame them!

In the long loneliness of the old-time voyages, when ships ran out of sight of land for months together and

stayed becalmed on one spot of ocean for days and weeks at a stretch, the sailor's only reminder of warm-blooded life was the birds which make their homes in the very heart of the ocean deserts. The brief spells ashore which punctuated the seaman's career at comparatively rare intervals, were inconceivably sordid. The boarding-house tout, the unlovely man-eating siren, and bloated John Barleycorn, are not happy memories of the good old days of sea-faring. But these tainted interludes must have served to heighten the sailor's love for his deep-sea birds. They must have seemed angel-like, and have roused devotion as well as superstition.

In general there are few real land-lubbers among the birds. The majority are equipped with marvellous sea-going powers which far outstrip those of the most expert navigator. At certain times of the year, flocks of migrants are one of the sights of the ocean, and one of the chief perennial delights of lonely lighthouse-keepers, who enter them up in forms prepared and supplied to them by the Wild Birds' Protection Society. But these birds, from the tiny willow wren upwards, which travel such great distances by sea, can neither rest on that element nor take any food which it can offer. The birds which can do both of these are divisible into two classes, like ships, namely coastwise and ocean-going birds. The most familiar of the former class is the sea-gull. He may be described as the marine-painter's bird, but only those of the deep sea can be called the mariner's birds.

The mariner's birds are of seven kinds, but of only two families: albatrosses, Cape pigeons, fulmars, molly mawks, petrels, shearwaters, and whale birds. The simple Englishman, whether soldier or sailor, will generally make something good out of a foreign word, and twist the raw material in such a way as not only to make it pronounceable to his conservative tongue, but will add a touch of genius which makes it seem to resemble what it is meant to represent. Albatross and molly mawk hit off the creatures to a nicety. They are the winnowings of Spanish and Dutch names, the former being *alcatraz* and the latter *mallemok*. Both these birds are of the same family. They belong to the southern hemisphere, and keep the deep seas except in the breeding season.

The fulmar, which resembles the common gull, except that his primary feathers are grey instead of black, inhabits both hemispheres, and was said by Darwin to be "the most numerous bird in the world." It never comes to land except for the convenience of depositing its single white egg. Fulmars are nearly always attendant on ships crossing the Atlantic, but they are so like the common gull that they are generally mistaken for them. The Cape pigeon is a petrel. She is one of the sailor's favourites. She will accompany a ship in her hundreds, and in calm weather rest on the surface so tamely that in sailing-ship days she could be taken with the hand by a man hanging from the rail when the ship took a roll. Of the other petrels likely to be met with, there is the whale-bird,

or prion, a gregarious creature, smaller than the Cape pigeon; the giant petrel, a heavy bird not unlike the sooty albatross; the shearwater, and the stormy petrel. Much lore and sea superstition has centred round this last little bird, which is called by the sailors Mother Cary's chicken. Its range is universal. In threes and fours it will follow a ship for days together. It is a small bird and of dark plumage, but its most distinctive feature is the curious way it hangs its feet in flight, as if it was just about to alight or to tread the waves on the tips of its toes.

The shearwater, too, is found all over the world, in mid-ocean and in a sea so landlocked as the Black Sea. Those of the family which live there, have earned from the Turkish fishermen of the Bosphorus the name of damned souls, which happily describes the kind of cry these birds give, particularly before rain. But if the Turks had known that the shearwater talked English, we might have suspected that the name had arisen on this account. There are certainly British fishermen who believe that the bird is so gifted, and that it says continually: "It 's your fault! It 's your fault!" Sailors call it the mutton-bird, because it is one of the few sea-birds which are fat and edible.

A frequent visitor to a ship when she is off the land, or just out of sight of it, is a hawk. Hawks will sit on the mast-head for long spells, and are often so dazed and so tired as to be easily caught. Sailors are not particular as to which is which among the hawk tribe, and call them all conveniently "sea-owls."

Occasionally one falls in with small fleets of jelly-fish provided by Nature with sails. The two kinds distinguished by the seaman are the Portuguese man-of-war and the by-the-wind sailor. The latter is the smaller creature. Sail is hoisted by the secretion of gas. The sails are small bags. When shortening sail the bags are deflated and the creature sinks.

An amazing æsthetic fact about the sea is the maintenance of its rule of silence and of things akin to silence. The beauty of its forms, shells, creatures, vegetation, is a mute beauty, the more refined since its qualities can only be perceived through the senses of sight and touch. And one of the most striking of those rare beauties which are akin to silence is the power of the marine creation to produce light without heat. This phenomenon is spoken of generally as the sea becoming phosphorescent. The term is objected to by scientists on the ground that the light produced is not in any way associated with the chemical element phosphorus. They would have us adopt their word *luminescent* instead. But after all, our established word only means that the light looks like phosphorus, and it perfectly describes the spectacle.

Phosphorescence is not all of a kind. It has many causes and can produce many effects in colour. But it is nearly always an accompaniment of calm weather. Sometimes it is manifested in pulsating shimmers of violet brilliance, dashed from the bow-waves of a ship stemming a warm sea in the dark. Sometimes it is seen in home waters, in fiery yellow

sparkles on breaking ripples, on plying oars, on trailing ropes, and where the wet sand has been trodden. Sometimes it reveals a spouting whale at night by lighting his fountain with brilliant sparkles, like a golden-rain firework. Sometimes it is a white, ghostly, all-pervading radiance, which throws up a kind of mist of light, and has the power of baffling the officers on watch upon the bridge almost as much as a fog. Sometimes it is seen in globes of light, floating deep down at uncertain depths, which glow and diminish to nothing, like eyes that open and close.

The power of phosphorescence seems to be distributed over a large and representative body of the watery underworld, from bacteria to the living coral. The presence of a certain bacterium can make a body that is infected with it, luminous. Sir William Herdman, to whose book I am indebted for some observations on this subject, mentions that Professor Girard captured certain sparks of light that leapt in all directions from his footfalls, and found them to be ailing sand-hoppers, infected with a light-producing germ. But allied to the sand-hopper is a smaller crustacean, which of its own power gives forth a brilliant blue light, when stimulated by the turning of a wave or other cause.

There is the plankton, *noctiluca*, which lies on the sea-surface like red dust, and has given rise to the name of the sea of that colour; its light is a silvery one. There is a small jelly-fish, which gives a green light, while sea-pens emit lilac flashes. And the

cuttlefish, of whom one would expect something quite out of the common, has the telling and modern provision of carrying red tail-lights. The more highly developed light-producing organs of the fish that live in the dark deeps below the sea twilight are as elaborate as eyes. The photogenic cells which produce the light are stimulated by oxygen from the blood. There is a reflector to direct the light and a lens to distribute it.

Besides the sea phosphorence, there is another kind produced by totally different causes, and called *St. Elmo's fire.* This phenomenon is not peculiar to the sea, but is much more frequently noticed there than ashore. It is generally observed on a dark night, either when snow is imminent, or, more commonly, when a thunderstorm hangs overhead. It is always impressive. The darkness, the motion of the ship and the noise of her rhythmic surge through the sea, the tenseness of the sultry starless sky, the glimmer of distant lightning, key all souls on board to expectancy. Then a small bluish light glows up aloft. Eyes are raised. The mast-head is seen to be lit up by a will-o'-the-wisp flicker, the ends of the yards also, and the margin of the funnel-top. And while all eyes are strained aloft, this sight is withered by a blench of lightning, and thunder toppling on the instant with the clap of a riven mountain.

St. Elmo's fire is a manifestation of what electricians call brush-discharge, that is, an electrical discharge from a cloud to the earth, breaking down the insulation of the air by a thousand tiny paths,

instead of one main spark-track. The thousand paths cause no light except at the point of concentration, where a brush-like fringe of light is seen. This downflow of potential may continue without any further development than St. Elmo's fire, but the chances are that the air insulation will more completely break down either over the ship or close at hand, there will be a flash, and the impatient cloud will get rid of its electricity through the usual lightning spout.

The saint himself was a Spaniard, and his attribute, fire, appears to have come from an amazing act of asceticism.[1] His enemies arranged that a lady of easy virtue should tempt the saint in the presence of ambushed witnesses. St. Elmo, instead of thawing to the lady's addresses, spread out the fire along the hearth, flung himself down bodily in the flames and smoke, and declared from the midst that on such a couch only would he receive her. Later in his life he was drawn to preach in the Spanish ports, and visited ship after ship, becoming famous among the sailors. Henceforth, when the blue light appeared at the mast-head, they said that it was a sign that their ship was under the protection of St. Elmo, and the lightning could not strike to hurt.

Phenomena of distortion, such as mirage, false horizon, and *fata Morgana*, are all caused by refraction of light as it passes through airs which have a varying density. The amount which a medium is capable of

[1] Baring Gould, *Lives of the Saints*.

bending a ray of light is called its refractive index. Thus a diamond has a refractive index higher than other translucent stones or glass, and facets are so cut as to make the most of this peculiarity, and give an effect of sparkle. If a stick is held in the water out of the vertical, it appears bent at the point where it enters the water, because it is seen through two mediums, air and water, whose refractive indices differ. When one looks through air which is stratified into layers in varying states of expansion, from sun heat to arctic cold, a distorted image is seen. The most curious of these effects is the one sometimes seen in the far north, when a ship will appear in the clouds sailing upside down, while nothing is seen of her on the horizon.

Fata Morgana is of fairly common occurrence in the Straits of Messina, and takes the form of elongating things in the vertical plane—a house appears as a tower, for instance. Under certain conditions at sea, not uncommon, a steamer on the horizon, or an island, will appear to have risen from the water and be resting on air.

Artists would have us believe that the bluest sea is the Mediterranean, while scientists name the Sargasso Sea. As the artist is credited with a soul, his vision is liable to an infiltration of sentiment, so perhaps we ought, in this case to accept the view of the latter. This is what the scientist has to say:

"Reflection from the surface causes the various differences described by different writers, and painted

by different artists. Omitting reflection from consideration, the colour of local seas is green, that of the tropical seas, on the other hand, blue. Occasionally the colour of the sea takes on a whitish, yellowish, reddish, or olive-coloured tint, but these appearances are invariably due to the presence of suspended matter, or of organisms. The normal colour of the sea is consequently either green or blue. . . . Small quantities of sea-water are colourless, both by reflected and transmitted light. Greater depths appear blue by transmitted light, according to the experience of divers."[1]

A chapter on the magic circle would hardly be complete without a reference to the sky. In 1894 the International Meteorological Committee classified the clouds. The results of their findings give us two main groups, four genera, and ten species. The groups are:

(1) Cloud sheets.
(2) Heap clouds.

The four families of cloud are *Cirrus*, the white feather-like filigree cloud seen high up; *Nimbus*, the dark, heavy rain and snow cloud; *Cumulus*, the great bubbly cloud like blown suds; *Stratus*, "a uniform layer of cloud like fog but not lying on the ground."

The ten species are made up of combinations of these names. Most familiar is the cirro-cumulus, or mackerel sky, and the cumulo-nimbus, or thunder-cloud. Cumulus and cumulo-nimbus belong to Group 2, and the rest to Group 1.

[1] J. J. Jenkins, *A Textbook of Oceanography*.

There are three families of storms, the *squall*, the *hurricane*, and the *tornado*.

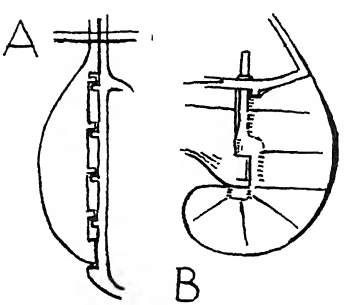
Perhaps the most dangerous of these, so far as shipping is concerned, is the *line-squall*. Its accompaniment is a long arch of low, black cloud. The squall stretches out in a long straight line and tears the sea to foam. Its habit is to travel from west to east. It is caused by the influx of a cold air current into and under a warm stratum. The *pamperos* of South America belong to this family.

The hurricane is a depression of small diameter and steep pressure gradients. It frequents the tropics. The word strictly belongs to what was called of old the Spanish Main, the seas of the West Indies. It is synonymous with the *cyclone* of the Indian Ocean and the *typhoon* of the Western Pacific.

In Africa the tornado has a special meaning, being a wind from the front of a thunder-storm. But its wider and more generally accepted sense is that of the tornado of America. It is a whirlwind which moves round a funnel-shaped cloud hanging from the sky like an elephant's trunk. When this passes over the sea it becomes a *waterspout*. If the tip of the trunk approaches the water the sea-water appears to rise up to meet it in a whirling vortex till the two columns join. In old days these waterspouts were much feared, and if there was cannon on board, it was the custom to shoot at them in the hopes of dispersing the menace. But the appearance of the rising column is said to be misleading, as the moisture caught from

these spouts which have crossed ships was found to be not salt but fresh—the substance not of a solid column drawn from the sea, but a whirling spray condensed from the atmosphere.

The famous Buys-Ballot's law of storms is as follows: In the Northern Hemisphere if you stand with your back to the wind the centre of the storm will be on your left hand, in the Southern Hemisphere it will be on your right.



TYPES OF RUDDER
A. Plate rudder. B. Balanced rudder.

CHAPTER XI

FLAGS AND LIGHTS

BUNTING has always been one of the delights of the sea. Until very recent times, ships reported to land stations when they passed so that their names could be telegraphed to the owners and reported in the papers as having spoken at these points. The verb to speak at sea is always used without the preposition. You speak the land or you speak another ship, or you signal*ize* her. The international code of signal flags is by no means out of date, but the wireless has replaced it in general use. It was a beautiful sight in old days, when your ship stood into the land to speak, to see the fluttering line of bright flags run up on the signal halyard, and to watch the gaunt mast ashore take up the conversation in another stream of bunting. It seldom happens now, unless you should pass a sailing-ship which wants to know her exact longitude and latitude.

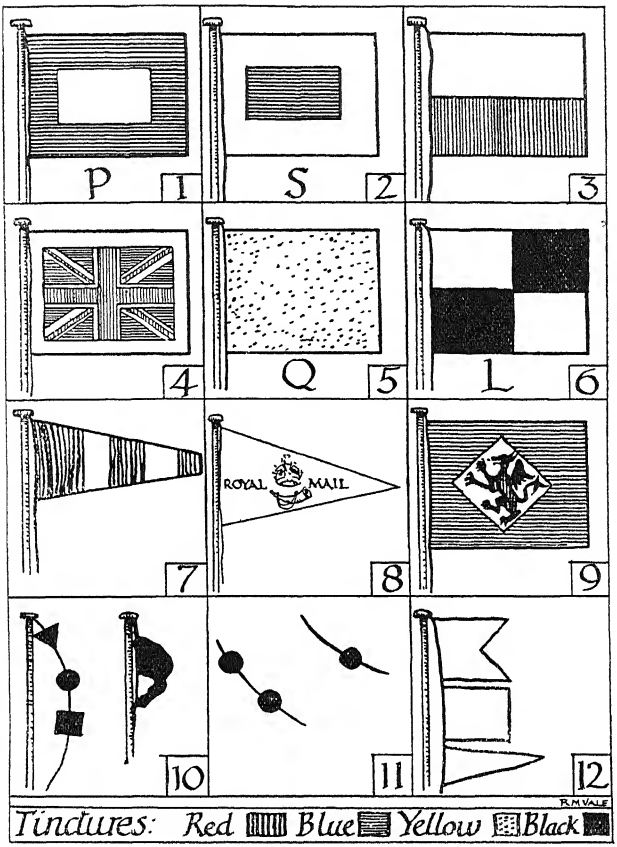
But certain flags from the international code are still flown on all occasions of entering and leaving port by coastwise and ocean-going ships alike, and some others of the simpler combinations from the code are frequently flown. The code is like the Oriental

graphic writing or the Red Indian sign language; it can be understood by all who see it, independent of what tongue they speak, provided they have the key to the combinations of flags in their own language. Thus, two ships of any nationality can speak each other and hold a conversation with comparative ease. In this respect it still has advantages over the wireless.

The single flags that are hoisted separately and stand for a full-blown piece of intelligence are shown on the next page. Probably the most familiar of these is P, the Blue Peter. It is hoisted at the foretop on the day a ship is going to sail. It is a distinguished-looking flag and is steeped in sentiment, second only to the national colours, by its association with going to sea, and the birth of new voyages. This, the departure flag, and two flags signifying destination, are the only sea-going ones which have enjoyed the familiarity of a Christian name—I mean the Pilot Jack, and the Jolly Roger.

If there is infection on board, the flag flown is not Q, the quarantine flag, but L. Q flown by itself means merely, "I have a clean bill of health but am liable to quarantine."

Sea flags are classed as follows: burgees, pennants, ensigns, and house-flags. The burgee is properly a small square flag with a V-shaped notch in the fly—that is, the edge remote from the flagstaff. The pennant (also spelt pendant, but pronounced without sounding the *d*) is a flag tapering from the hoist towards the fly to a square or a pointed end. Nevertheless,



FLAGS AND SHAPES

1. Letter P; international code; used as departure flag, also called Blue Peter. 2. Letter S; also call for pilot. 3. Pilot on board. 4. The pilot jack. 5. Letter Q; also denotes "I have a clean bill of health but am liable to quarantine." 6. Letter L; also called the plague flag; it denotes disease on board. 7. The answering pennant. 8. The mail pennant. 9. A house flag. 10. Shapes: cone, ball, and drum; wheft. 11. Daylight signals (left to right): "not under command," "at anchor." 12. Burgee (top), square flag, pennant.

like so many terms in the nautical vocabulary, the words are often interchangeable. Thus a yachtsman's burgee, denoting the club he belongs to, is a pointed flag, and the commodore's broad pennant is swallow-tailed.

Flags were probably a land invention, though the old Norse sagas tell of pennants and standards carried by Viking ships. In the days of chivalry the designing of flags, and rules governing their use, came naturally into the province of the Heralds' College, which was in fact responsible for that familiar creation, the Union Jack. The stars, stripes, and eagle of the United States of America probably have a heraldic origin also—the three emblems coincide with those of the old Washington crest and coat of arms. The Royal Standard is the personal flag of the Sovereign; other members of the royal family have their own standards. The word is otherwise used ashore chiefly to denote the banners of cavalry regiments, while the infantry are content with the less pretentious but more romantic word *colours*. House-flags belong entirely to the sea. They are really the private standards of shipping firms, each displaying the badge or particular colours of the owner.

The three British ensigns, white, blue, and red, are relics of the days, when the fleet was divided into three squadrons of colour. The admiral himself, in the red squadron, flew the red ensign at the maintop: the vice-admiral in the van, with his white squadron, flew the white ensign from the foretop, and the rear-

admiral, in his blue squadron, flew the blue ensign from the mizzentop. In the end it was found inconvenient and confusing to fly different colours in action, and by Nelson's instructions Trafalgar was fought entirely under the white ensign. In 1846 the British Navy gave up the red and blue ensigns.

The chief place of honour for your flag is the head of the mainmast, called the maintop, the next is the foretop, then the mizzentop. The chief flag of the British Empire is the Royal Standard, and this is broken out on the maintop of a ship immediately the King steps on board. In merchant ships the ensign was formerly worn at the end of the yard-arm, and signal flags were run up to that point. Later these flags were flown from the *peak*. In steamers where the seat of authority has shifted from the poop to the fore part of the ship, and the signal locker has moved with it, the signal flags are run up from the bridge, on a special halyard which is rove through a small block on a stay connecting the funnel and foremast. The ensign is flown from the stern on a flagstaff and there is another flagstaff in the bows called the jack-staff—a relic of ancient days. It was formerly rigged on the bowsprit, and before that it kept the flag flying on the battlements of the little wooden castle that was built out on the bowsprit, and was the original fore-castle. The fo'c's'le (as it is now pronounced) has moved in-board more centuries ago than it has had letters worn out of its spelt name. But the little flagstaff kept its airy station out-board till dolphin-

striker, figurehead, and bowsprit all vanished, and now in our days it has come in-board and is once more in its old place on the forecastle-head. But its function as a flagstaff is purely ornamental. For instance the pilot jack is often flown from it, but when so flown has no meaning beyond that of gaiety.

Thus the bunting on a merchant ship is to be read not only by colour and design but also by its position on the vessel. A flag at the foremast-head will be be either a code flag or the ensign of the station to which the ship is bound. At the mainmast-head will be the house-flag; at the staff over the taffrail, the ensign of the country from which the ship hails.

To fly the white ensign has been the exclusive prerogative of the navy and the Royal Yacht Squadron since 1864. The blue ensign is the flag of the public services. The Board of Trade, the Customs, and others have their own badge in the lower right-hand canton of the flag. Notable among these devices is that of the Telegraph Department which sports a figure of Father Time, who grasps his hour-glass, which is observed to have been shattered by a flash of lightning. The blue ensign is also allowed to be worn by merchant ships commanded by an officer of the Royal Naval Reserve, who has on board at least ten able seamen of the like qualification. All other merchantmen carry the red ensign, which is, in fact, the most striking of the three flags and was the colour originally appropriated by the admiral of the fleet. But the white ensign is a wonderfully

chaste banner, and we remember that Trafalgar was fought and won under it.

All lights at sea are strictly controlled by international conventions. This puts a stop effectively to enterprising publicity people, who would like to ravage the night watches of the ocean with electric signs. It is one of the unthought-of things to be thankful for that we are safe on certain squeamish occasions from the sight of "Dash's home-cured bacon," picked out in green bulbs, swaying lividly in the mid-dark night.

Every light observed at sea has a meaning. The simplicity of these signals, the beauty of their colours, and the response of their reflections is one of the wonders of voyaging. Dropping down the Thames on a still, clear night, silent and star-lit, is an experience worth many pageants. But it is more interesting to know the language of the lights than not. The time for lighting up for ships and lighthouses is sunset, and all lights must be kept going till the hour of sunrise. All vessels under way, except rowing-boats, must carry side-lights, a green one to starboard, and a red one to port. These are easy to remember by the simple tag that port wine is red. A sailing-ship is not bound to show any other lights except when she is being overtaken. Then a white light must be exhibited at her stern.

Steamers must, in addition to the side-lights, carry a mast-head light. They may, and generally do, carry a second mast-head light. While the first is fixed on the foremast the second will be on the mainmast and higher above the deck than the one on the

fore. They carry a fixed light astern. When a steamer is broken down and is not properly under control, but is nevertheless under way, she keeps her side-lights burning and, in place of her mast-head lights, carries on the foremast two red lights, one above the other. By day she would exhibit two black balls on the forestay. If, under the same circumstances, she is hove-to, she extinguishes her side-lights. If at anchor, she carries a "riding light" in the forestay and one in the stern. The ordinary mast-head lights of a ship should be visible in clear weather for five miles, and the side-lights for two miles. For this reason the mast-head lights are visible long before the others. Also liners showing bright lights from their passenger accommodation can be made out by the glare before any of their official lights become visible. Signalling in Morse code by lamp is done from the bridge.

There is a third method of visual signalling, which comes midway between the flag and the lamp. It is a daylight method used when the weather is hazy, or the light bad, or when the objects communicating are too far off from each other to be able to distinguish colours. It is called distant signalling and is effected with *shapes*. These shapes are solid black objects which show up well against a sea or sky background. The changes are rung on four symbols; the ball, the drum, the cone pointing upwards, the cone pointing downwards. Supposing a ship has neither drum nor cone on board, the resourceful mariner has recognized substitutes. Any square flag may be used to signify

the cone point upwards, a pennant for the cone point downwards, and a *wheft* for the drum. The wheft, as understood here, is a pennant with its streamer point tied back to the signal halyard so that the flag forms a bulging loop. These substitutes are planned because it is unusual for a ship to have to make signals with either cone or drum, hence they may easily not be forthcoming when required. But the disk signal must be always ready as two of these (see illustration, p. 161) must be sent up immediately if anything goes wrong with the steering or propelling machinery.

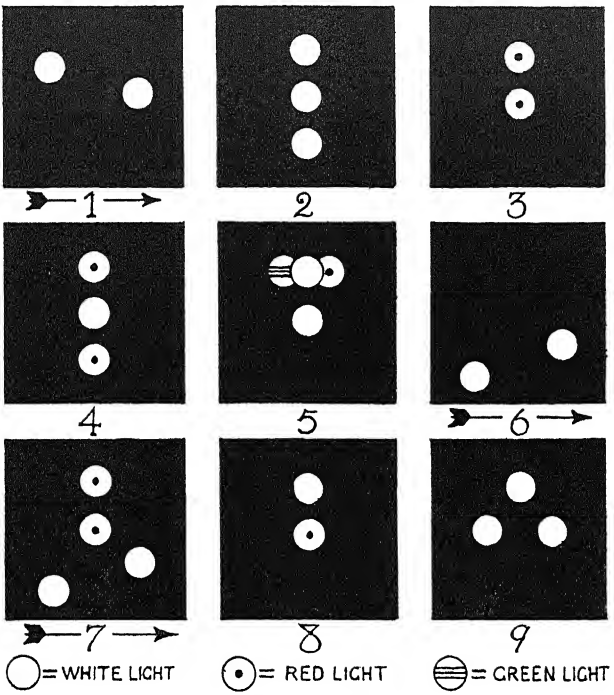
Cone and drum signals are more frequently used by shore stations than between ship and ship. On shore they are set to indicate approaching bad weather or the depth of water over a bar. If a gale is expected, a cone will usually be hoisted at a port, a Lloyd's, coastguard, or pilotage station. If the cone has its point upwards it portends a wind from the north (of east or west). For a wind expected from south of east or west, the cone points downwards. At such stations a drum hoisted by itself generally means an indication as to whether or not there is water enough to cross a river bar.

Distress signals are all simple. The wireless has its famous S O S. In flags it is N C. There is a simple signal in shapes, and the ensign or jack flown upside-down spells distress. Other daylight signals are a gun fired at intervals of a minute, and a continuous sounding of any fog-signal apparatus. At night, in addition to the gun or fog-signal apparatus the law

prescribes: "Rockets or shells throwing stars of any colour or description, fired one at a time at short intervals," also "Flames on the vessel (as from a burning tar barrel, oil barrel, etc.)," and there are patent flares to simulate the tar barrel, "specially approved" by competent authority.

The reply of the life-boat station is to send up two red-star rockets and fire the assembly gun—one of the great dramatic pieces that never fails to thrill. Whistles blowing in fog have a meaning as well as that of merely giving warning. Thus a prolonged blast sounded every two minutes means "I am under way." Two blasts every two minutes means "I am under way, but stopped." One long blast followed by two short ones means either that a ship is towing, or that she is engaged in picking up telegraph cable, or that she is not under command. A ship at anchor rings a bell lustily for five seconds in every minute. Up-to-date steamers and motor vessels have whistles equipped with a device that blows off automatically at required intervals. Sailing-ships are provided with automatic horns and give signals in the fog indicating whether they are on the port or starboard tack, or whether they have the wind abaft the beam.

Other whistle signals are for helm and towage. These are as follows: one blast means going to starboard; two, to port; three, "I am going full speed astern." A tug by one blast intends "Steer more to starboard, you"; by two, "Steer more to port"; by four, "Cast off hawsers."



SHIPS' LIGHTS

The diagrams illustrate the lights on ships as they appear end-on except where an arrow is shown. An arrow indicates that the view is broadside-on, and the direction of the arrow indicates the relative position of bow and stern. The red and green navigation lights common to all ships *under way* are not indicated, except in Diagram 5 where they are shown from the mast in a combined lantern.

1. Steamer under way. 2. Tug towing more than one vessel. If towing one vessel only, two vertical lights. 3. Ship not under command through some accident. 4. Cable ship repairing or laying cable. 5. Steam trawler under way. 6. Riding lights. Ship at anchor. 7. Ship aground. 8. Pilot steamer under way. 9. Dredger at work.

CHAPTER XII

SAFETY

Less than a hundred years ago, as I said in the first chapter, the yearly toll of wrecks round the British coast alone ran into thousands. There are still a great number of casualties among small craft and fishing-boats, but the loss of a passenger-carrying steamer is rare. Conditions are so much altered that the percentage of loss of life in sea transport is a great deal less than it is in land transport. The improvement is chiefly due to the increased power of marine engines, to wireless communication, and direction-finding. Nevertheless, ships are so much bigger that disasters, when they do occur, are all the more frightful. And the lesson one invariably learns from these mishaps is that of unpreparedness on the part of the passengers.

Every one admits that in the nature of things the water is an element more fraught with danger than the land. Yet people will take all kinds of precautions for avoiding accidents when they travel by land who will not take the most elementary steps to ensure their personal safety at sea. This attitude is equally unfair to the ship's company and to fellow-passengers. When the whistle blows for boat stations, and it is not a false alarm, there is not a moment to be lost in looking for your life-belt, trying it on, reading

instructions, inquiring the way to your boat station. When the warning has sounded neither the officers nor the crew should have to think about the passengers until the boats are swung out ready to receive them. Why should they? Why on earth *should* they, at the moment when all forces must be concentrated on apparatus, have to divert attention to intelligent beings who have had nothing to do since they came on board but eat and sleep and read notices?

As a matter of fact, sailors are almost as pig-headed as passengers on this question of preparedness. Like the steward when confronted with the subject of *mal de mer*, they prefer to pooh-pooh the idea of disaster, as if to mention it merely were to court it. But never say your author has not told you!

In passing, it might be of interest to say something about the equipment of the ship's life-boat. The number of people that each boat is supposed to hold is cut in the stem. It comprises crew and passengers. There are stores in the boat which, in British ships, are renewed continually under supervision of the Board of Trade surveyor at the home port. The water is kept in casks called *breakers*, and the amount contained in them is one quart of fresh water for each person the boat is intended to carry. For food there are air-tight tanks which hold two pounds of biscuits per person; there should also be some condensed milk. There is a lamp and a bucket, the former being made to fit into the latter. The connection is not obvious at first sight. But the idea is that by dipping the lamp

in and out of the bucket it is possible to make morse signals, . . . — — — . . . (S O S) for instance, and attract attention, where a steady light might not do so. But there are also twelve red flare lights in an air-tight tin: a sealed match-box is stored inside the lamp—the flares have their own patent lighters. There is a compass and sea-anchor. The latter is a conical bag, and is used for holding the boat, head on to the weather, if it is considered safer that she be hove-to to ride out a storm. There is a can containing a gallon of thick oil, not for the lamp but to use from an oil bag for breaking the crests of chasing waves. There is a mast and sails, two spare oars in addition to the boat's set, and one oar for steering in case the rudder gets damaged. The steering oar is larger than the others and is painted white to distinguish it at night.

It is intended that the rowing should be done by the crew—even stewards nowadays hold certificates for proficiency in life-boat management. If the passengers consist of men, women, and children, the men sit on the upper thwarts and round the side-casings, while the women and children will be given more shelter on the lower thwarts and on the bottom of the boat.

I reiterate, it is a wicked thing for passengers not to make themselves prepared for an emergency. The sailors will care for the safety of the ship so long as there is a chance of keeping her afloat, but when the last hope goes they must surely be assisted by the

passengers and not hampered. A ship will never be abandoned till the last minute. This vehicle of transport which may appear as nothing more than so much iron and wood to a person who has bought a passage in it, is not a *thing* to the sailor's mind, but a feminine personality—*she*. It is not even *a* ship: it is *the* ship. The tradition of the sea is safety of ship first, women and children next, everybody else next, self last. It is a better maxim than we have ashore. The point of view of death is one of the great differences in outlook between seaman and landsman. The old sailor's supreme contempt of danger was automatic. He trusted in what we don't understand but label "fatalism." He held it to be useless to learn to swim, in fact unlucky. If "it was to be" that your end would be by drowning, why prolong the agony by learning to sink slowly? On the other hand he took no foolish risks such as sleeping with his feet towards the bow, the way corpses lie. His head must lie with the ship's head, and does so still, even in the motor vessel.

The most daring fleets in the world to-day are the fleets of tunny-fishers which sail from the ports of Brittany. Every year at a grand *Fête des thonniers* the priest goes round in a life-boat and blesses the brightly-coloured hulls. Two days afterwards, they spread their canvas and sail away to the southern bourne of the Bay of Biscay. Hardly ever does the fleet return intact. They face the open Atlantic, and ride it out in all weathers. Whole ships vanish, by

ones, by batches, engulfed. On the day between the fête and the sailing, the owner's agent goes aboard each vessel. He inspects their life-saving gear and always finds it out of order. He frowns and points out "c'est la vie!" They are polite, but scornful. Who thinks about one's own safety? Better to pin one's faith to the little Virgin over the cuddy door than meddle with rockets and life-belts; *she* looks after the safety of the ship.

The German submarine is responsible for great improvements in the life-belt since 1914. But the life-buoy, which is almost as much a symbol of sea-going as the anchor, has not been modified for a long time. The approved pattern will float thirty-two pounds of iron for twenty-four hours. On steamers, life-buoys have small canisters fastened to them, which in turn are attached to the rail. The rail attachment tears a cap off the canister when the life-buoy is pulled away from it, and when the life-buoy reaches the water the canister lights up of its own accord and burns a flare with smoke, visible day and night. The method of entering a life-buoy is to press the edge nearest to you down in the water, when the far rim will rise up and drop over your head and shoulders.

CHAPTER XIII

TIPS OF ALL KINDS

AMONG the superstitions of the sea which still persist is the idea that a passenger is not a normal person. It is almost like the ancient theory of demoniac possession. A sailor once told me, shaking his head: "Good, ordinary, common-sense people, when they come to sea—something comes over them!" There is an atmosphere of mystery about this curious transformation—or is it aberration?—hinted at. A steward put the matter to me less keenly: "I always maintain," he admitted stoutly, "that *some* passengers is all right." But then a steward, of course, is only half a sailor, and no real sailor would go as far as that. When one comes to examine the superstition, one has to admit that it is far from insulting, but really very kindly meant. It is by no means an uncommon thing, for instance, for first-class passengers to rub-up their boots with face-towels, to force their way on to the bridge at midnight and demand to see the captain with a frivolous complaint, to refuse to put on life-belts at boat practice, to raise a panic when no danger threatens, to complain bitterly and incessantly about everything the shore company and the ship's company have done to make things pleasant. When these things, and much worse than these things,

are taken into account, the toleration of the sailor almost takes our breath away; and we may be glad enough to accept his explanation that we are only, after all, temporarily insane—merely suffering from another kind of sea-sickness fatal to landsmen.

Madness is better than vice, but it is not an enviable state; and it is high time that we landsmen set to work to initiate a fairer reputation for ourselves at sea. The first step is that every ocean passenger should know how to begin a voyage well, to settle down comfortably, and make himself at home on a ship as quickly as possible; the more contented the passengers, the better the voyage for all concerned. This fact becomes important when it is realized that every voyage that is made contains the potentialities of a first-class novel, and often realizes them.

Now it is essential to the happy voyager to make a good beginning and a good ending, but how to do so perplexes many. The adventure of the voyage lies in how you meet your fellow-passengers and how you part from them. But it is not too much to say that these destinies again largely depend on how you meet your stewards, how your stewards meet you, and with what measure of understanding you intend to part from each other.

Briefly, the first rapid moves to make after having got on board are as follows:

(1) To find your cabin and secretly make a brief but impressive mental note of the exact position of your life-belt.

(2) To find out the time of breakfast. If there are two sittings, to decide which one you prefer to attend and to communicate your wishes at once to the second steward, if first class, if otherwise to the head steward of your dining-room.

(3) To fix the time of your bath.

(4) To fit this in with an appointment with the gym instructor (if you intend to be gymnastic before breakfast).

(5) To see the deck steward about a deck-chair and a rug, and try to bag what seems to you the best place on the ship to have this furniture permanently located. (Remember that when going west, the sunshine is all on the port side; when going east, all on the starboard side.)

(6) Make a strong resolve to find out privately before nightfall the position of the emergency muster station, and to make a quiet pilgrimage along the shortest route from your cabin to that spot. (See Chapter X.)

The next question that will turn up is, Who are you going to eat meals with during the voyage? If you have no views on this subject the matter will be settled quietly for you; only if you do not like the arrangement after it has been fixed you may find it as difficult to change your table as the leopard his spots.

Of the tables presided over by the ship's officers, the captain's is naturally the place of honour, but it is not necessarily the most entertaining. In

this exalted place you must look distinguished, and forgive your neighbours for adopting the same pose. If you like talking in the dignified strain, you will be able to do so at this table, as the captain is generally a polite but silent man. The chief engineer is often the reverse of silent. The noise of his engines may even have made him garrulous, and he often has strong notions on what entertains passengers in the line of drawing-room stories, and may prefer listeners to talkers at his table. The purser is a little more than a man of the world, he is a man of a particular world in which figures are governed by tact, and man by both. Unless you know your purser you may find a dash of the schoolmaster about his management of the table talk. If you want liveliness, it will be bad luck, should you sit at the doctor's table, if you do not get it.

Not infrequently the best host on the ship may be the chief steward. While officials on board ship incline to be professional the chief steward is generally humane first and professional next. And probably the reason is that he has worked up his knowledge of psychology not from the soul downwards, but from the stomach upwards. The bridge and the engine-room yield subjects for painter and romancer, though seldom one who practises the arts. But there are chief butlers sailing the Western Ocean to-day, who are secret votaries to the muses, though their modesty keeps the matter hushed up.

The question of who your fellow-passengers are

going to be, is perhaps of more importance, particularly if the voyage is to last longer than a week. If you are a first-class passenger and know no one on board, it is probably wiser to let things take their course. But if you are travelling tourist-third, the matter is rather different. In the latter, the contrasts of type and social grade are much more violent, and the available space in which to escape from the people whom you are tied to by the bond of eating is much less. But also in this class, the human element is more at its ease, less conventional, and therefore quite accessible to swift overtures of acquaintanceship. By a word to the head-steward, you can gain a few hours in which to test your powers of selection and diplomacy, and hopefully collect a party that will be mutually satisfactory.

Tourist-third class is a post-war invention that has done more to popularize intercontinental travel than any other device the manipulators of the touring public have ever thought of. It owes its inception to the Dillingham Immigration Restrictions Act, which, at a blow, swept the steerage decks of all the great lines. The Americans started the idea. Students from the American universities who had been accustomed to work passages over to Europe in the vacation as under-pantry-men, cooks' assistants, etc. were the first patrons. British companies who could no longer get their emigrant space filled, followed the idea up with energy and found that it took on. Some ships glorified the existing third class a little, put a wine-list on the dining-table and called

it tourist-third. Other ships which could not make the second class pay, cheapened the rates and called that tourist-third. It was the combination of words that worked such wonders. The word *tourist* thus made into an adjective lifted the obloquy from *third* and not only raised it to a higher degree of respectability than *third* on the railways but added to it a sense of adventure which appealed tremendously on both sides of the Atlantic. With the rising up of the third class came the democratizing of the first class in which for once an old nautical word was revived—the old word for first class—*cabin*. This name seemed to fit in happily with the idea of comfort without excessive speed or undue luxury. More and more ships were converted and new ships were built, some cabin and tourist-third, others one class only—cabin.

The name "cabin" has gone down well. It must seem natural enough to seamen and perhaps this has helped to popularize it. As a matter of fact, first, second, and third class at sea are terms which in British sea law have never been recognized. In British law you are either a cabin or a steerage passenger. The judge will tell you that if by first class you mean cabin, the second class is just as much steerage as the low haunt in the 'tween-decks where the emigrants lie. Marine law has a way with it. It is not aware of the captain of a merchant ship, only of the master. It has adopted an impersonal figure called a "statute adult." This means a person of the age of twelve years and upwards. But two persons between the

ages of one and twelve are held to comprise one statute adult.

Backing to our subject, cabin fare is cheaper than first-class. In the Cunard Line the cabin ships are not so fast as the ships which carry first class, nor so luxurious. In the C.P.R. the cabin ships are cheaper but they are also faster. There is little to choose between them in point of comfort except that the first-class ships have linen sheets and the cabin ships have cotton ones. The chief difference between the old superior accommodation and the new is that there is less of the class feeling about the cabin passage, less shore formality kept up, and more sea air.

The tourist class is inferior to the one above it chiefly in deck-space. At present it is distinctly cramped in this respect. Otherwise it is nearly as good in food. The beds, the baths, and the bar are as good. In new tourist ships there is a shop, a library, and a barber's shop, though there is not, as a rule, either a swimming-bath or a gymnasium. It even has some points over the upper class. It is more in the holiday mood. Life is lived freer. Acquaintanceships can be struck in the space of a moment —and no one dresses for dinner.

There are only two discomforts likely to overtake one on board a modern ship; the first, of course, is sea-sickness, the second soreness of eyes from exposure to so much reflected light off the sea. The latter is easily remedied by taking a pair of tinted glasses. Sun-glare causes headaches as well as eye-soreness,

and as this is sometimes mistaken for the approach of sea-sickness, the monster, who quickly profits by any nervous weakening, may score a victory, where he could not otherwise have conquered.

The doctors tell us that they have discovered the cause of sea-sickness to be located in the region of the ears. That is very interesting and very unexpected. But as they cannot go the necessary step farther and effect cures, mastering the scientific side of the ailment does us no good at all. One thing is certain about it, it only affects the subject who is wide awake. If you are asleep, you are not sea-sick. Two things fend it off, one is warmth, the other food. It is essential to keep warm. I would say to the sufferer: "Get your stomach in good working order before you sail and then go on keeping it constantly supplied with plain food without over-eating, and at the same time go on keeping it in order." The natural processes will require a little assistance also, as sea-air is the reverse of laxative. Stewards, no matter how long their experience, deprecate the idea of sea-sickness. They have a fixed idea that it should not be spoken about or anticipated in any way, because it makes the passenger nervous and therefore more prone to succumb. Consequently they prefer to be summoned for a receptacle rather than place it in one's cabin—in case. That is a mistake. The receptacle should be there, no matter how ugly the steward may think it looks. The anxiety about ringing the bell will prove much more fatal. If the first symptoms come

on, there is no position better than lying on one's back.

There are two remedies which I have heard well spoken of, though I have never tested either. The first is that of placing small plugs of cotton-wool in the ears. The other is more elaborate, but I have heard medical men who are bad sailors and have tried it swear that it is efficacious. You get a binder and wrap it puttee-wise tightly round the abdominal region. This keeps the viscera from moving about and giving you that "lost my stomach" sensation. It sounds to me a likely cure.

One of the things that exercises the minds of passengers unused to voyaging is how much to tip at the end of the journey. Most people finally give much about the same thing, but it is a great bother to find out. The average tips, and those that should content all concerned in this mysterious *sub rosa* transaction, are as follows. Per week (or for the Atlantic passage, which is less than a week to the States, and more than a week to Canada):

First and Cabin Class

Table steward, £1.

Bedroom steward, £1.

(For meals served in cabin or for sickness, a little more.)

Bathroom steward, 10s.

Deck steward, if you have had a deck-chair, 5s.

If he has regularly served you with meals other than afternoon tea, 10s.

Lounge steward (only if you have used him for borrowing books, etc.), 2s. 6d. to 5s.

Lift-boy, perhaps 2s. 6d.

Wine-steward, a small tip, if you have used him.

The head-waiter, if he has ordered you special dinners, something. If not, nothing.

Gymnasium instructor, according to the amount of instruction he has given you, 5s. to £1.

The smoke-room steward. You had better consult fellow-passengers on this point, unless you have tipped with every drink ordered. In this case there is no need to do more.

Some people give half their tips in advance, and these maintain that great advantages in service are gained thereby. I disagree. By this method the steward knows exactly how much you are worth to him, and it destroys the fineness of relationships, and the pleasant fiction of a surprise packet. Your modern steward is human, and often humane.

For second and tourist class the above amounts should be exactly halved.

Although it may, or may not, be good to tip in advance, it is an excellent thing to tip every week on a long cruise. On intermediate boats and on some less frequented routes the tips expected are less than the scale quoted, which is the full Western Ocean rate. But to tip much above this scale, unless you have given an extraordinary amount of trouble, is to

do a disservice to the chief steward, as it is sure to make his staff discontented.

As a tail-piece to the subject of tips I might add a word on the curious subject of *comme il faut*. From a year-book of 1929 designed to be helpful to authors, I take two quotations:

"Don't say 'on' a ship. You do not live 'on' a house. 'In' a ship or 'on board.'"

"Don't say 'boat' when ship is correct. Roughly speaking, no vessel over a hundred tons can be described as a boat."

That is laying down the law with a vengeance! These hints apply absolutely with regard to the navy, but not at all to the merchant service. The terms "ship" and "boat" are both legitimate. Either way you are "on" and not "in" either of them. The largest ships in the world are commonly referred to as Western Ocean *boats*. And when we catch the *boat* trains for France or Ireland, I am sure we should be greatly shocked to step off on to something that was less than a hundred tons.

It is a grave solecism to address your captain as "skipper," and nearly as bad to hail your dining-room or smoke-room steward as "waiter."

A chapter with such a pretentious title as this one is bound to contain some advice on clothes and luggage for the voyage. As to the former, deck-shoes should be taken if the voyage is longer than a week or the cruising element enters into it. By this proviso I mean if you are going to sea for the sake of the voyage,

and not as matter of necessity—a coastwise trip for instance. In such a case you want to emphasize the yachting spirit, and deck-shoes go a long way towards this. Working aloft from deck-shoes comes the garment, plural in number but singular in every other respect, called by the cautious Victorians "continuations." Nothing can beat grey flannel trousers. You can appear presentable in them, and at the same time be perfectly comfortable. Americans are more conventional about sea-wear than the English. They go in for plus-fours and cloth caps. So particular are they about their caps that the author of the *Frantic Atlantic* advises: "Buy your steamer cap in New York or wherever your home is. For some reason caps sold on steamers are either French or English and do not seem to be picked by a discriminating mind." An English cap, of course, does not suit American plus-fours. On the other hand an Englishman could not reasonably be expected to wear an American cap. Plus-fours are not becoming, like knickerbockers, but they have achieved much greater success, due I imagine to the fact that they can be made to suit all legs—can be worn high for the exemplary calf, and low for no calf at all.

Of course, cruising anywhere south of the Tropic of Cancer, white ducks and Indian gauze underwear are essential. But wherever you go at sea, Arctic or Tropic, a warm overcoat is the most indispensable garment. For ladies woolly wear is the thing at sea, and a large assortment of evening dresses (including

at least one fancy dress)—the manslaughter, whether on deck or below hatches, is all done after four bells in the second dog-watch.

The only thing I have to say about luggage is that a cabin trunk with a suit-case handle is a useful article; that a soiled-linen bag (two for a long voyage) is essential, and that something with pockets in it to hang up on the bulkhead is a wonderfully useful addition to the cabin fixtures. And cabin fixtures, except wardrobes, have not advanced with the rest of the ship's fittings.

CHAPTER XIV

DECK GAMES

THE sports department has not kept pace with other things on board ship that have been pushed out of their ancient shape by modernizing influences. The chief reason is that it has been nobody's child. Every passenger ship has her "establishment" of games and somebody is told off, voyage by voyage, to see that they are set going. On long voyages the purser will organize a games committee from the passengers. On a certain ship there will be an officer keen on deck games; and that will be a happy ship. But no lively interest has been shown in them ashore at the shipping offices, though recently the Nelson Line has given what may prove to be the first big push in a new direction by making deck-space for deck games instead of trying to make the latter fit what was intended for promenades and deck-chairs.

When shipping companies realize that deck games are among the greatest attractions they can offer, this neglected arm of the merchant service will probably be transformed. At the moment, although the available stock of deck games is limited, every ship goes her own way and has different rules for the same game.

Of course, there is a great deal to be said for games that have *not* been modernized. There is a special sea charm in the rope quoit with its whiff of tar, the crude shuffle-board disks touched up with ship's paint, and the fine bold chalked figures done by the deck sailor. Whoso can appreciate these points of artistry will not wish for any change. But the deck sailor, while he pays great attention to making unimpeachable figures, generally has no definite notion as to what the length of the pitch should be, and if he has one, is not very pleased with any passengers for holding different notions. Also the shuffle-board cues will probably all be of different weights, and the disks too, because the manufacturers have never been shaken up by the shipping companies, whose meanest clerk would not tolerate a golf-club or tennis-ball turned out in the same way.

Rules of deck games as they are played on different ships of different lines are, in the main, a tradition of the elders that has not been reduced to print or even to typewriting. But some companies publish brief pamphlets on the subject and some issue typed sheets. They all differ widely. In giving the following list of rules, I have tried to choose for each game the rule of a line of steamers, which seems to be most typical and nearest the fixed point of standardization.

Quoit Games

Deck-Tennis

The queen of deck games is deck-tennis, which is really a quoit game because the chief skill lies in how you throw a quoit for place. And it is much more difficult and much more important to learn to become a good placer, as mere practice without gumption will make you a good catcher. Good placing requires quick wit as well as good range judgment.

What may be called standard dimensions for a court are laid down by the makers of the Tenikoit rubber ring, as follows:

Singles. 40 ft. by 12 ft. Neutral ground-line, 3 ft. on either side of the net.

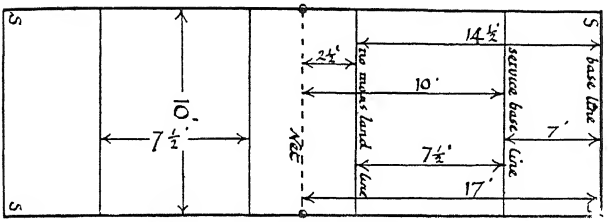
Doubles. 40 ft. by 18 ft., with a line down the middle. Neutral ground-line, 3 ft. on either side of the net.

Net-supports 5 ft. Height of net at centre 4 ft. 9 in.

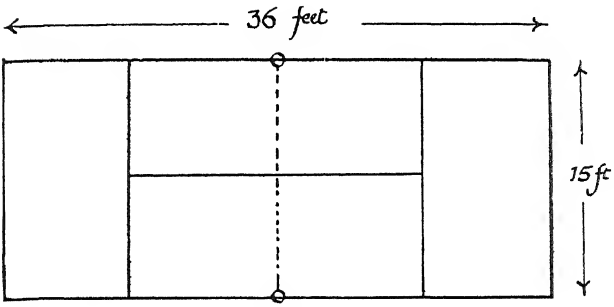
Commander Bisset of the Cunard Line recommends a court 34 ft. by 14 ft. for doubles, with neutral ground 3 ft. on either side of the net. Height of net, 4 ft. 9 in.

But the size of court is generally governed by the deck-space available. The Canadian Pacific Railway rules, which are typical of general practice, are given as follows.

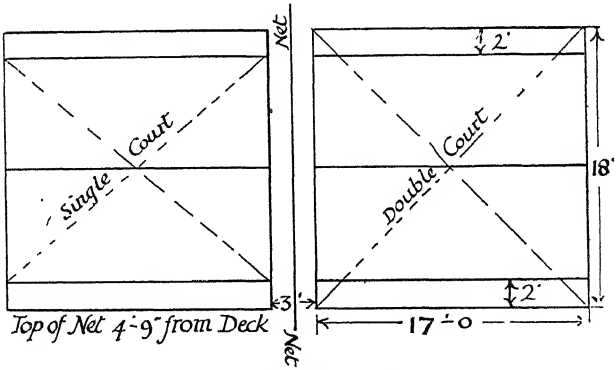
The service and scoring as in lawn-tennis: 15—30—40—advantage—game. Six games to the set. The server is allowed two faults.



1. A singles court.



2. A doubles court



3. A combined court.

The quoit may be served fore-hand or back-hand. But in serving or returning it must be dispatched from a level below the line of the shoulders. These rules, and others, insist that "it must have an upward tendency of at least six inches." But how this figure is to be either observed or checked by an umpire, I fail to see. Nor do I see the point of enforcing such a rule. As long as the quoit is thrown from a point below the level of the shoulders and clears the net it seems to be all that is required of it.

The following sound observation occurs in the rules of the makers of Tenikoit. "The ring must not be thrown or served over-hand in any shape or form, nor is a flat-thrown ring allowed. The temptation to throw flat or over-hand rings is very great, when a fast rally is played close up to the net. Flat or over-hand rings absolutely spoil the game, they stop all open play, and check the beneficial exercise the game provides."

Nor, personally, do I hold with twirled rings, though most ships' rules admit of them, except in service throws. It is a kind of frightfulness. Twisters are bound to be slow and are not hard to catch. But they are responsible for a great many broken nails.

The points that score against one are:

(1) Pitching the quoit outside the proper court.

(2) Failing to clear the net.

(3) Pitching the quoit into neutral ground.

(4) Failing to catch the quoit before it hits the deck within the court.

The opposition can claim the following points as fouls, and score off them accordingly :

(1) Catching quoit with both hands.

(2) Catching quoit simultaneously with one's partner.

(3) Failure to return the quoit immediately.

(4) Returning quoit over-hand or above the level of the shoulders.

(5) Serving or returning quoit when both feet are off the deck.

(6) Having a foot in the neutral ground, when returning a quoit.

(7) If a quoit hits any object of ship's furniture or fittings before reaching the hand, it will count against the thrower. If it hits any part of the body or clothing of receiver or his partner, it will count against receiver.

Some rules hold that the quoit must not touch the clothing or any other part of the body than the hand which deals with it. This seems to me too fine a distinction and likely to spoil the romping nature of the game.

The point where the quoit hits the deck, and not where it rolls to, counts. If it touches the line when it first falls it shall count as being within the court, which definition will also include the neutral-ground line.

Formerly the quoit was always made of rope, the size of a peg-quoit, wrapped round with linen or velvet. The rubber quoit is rapidly superseding this more truly nautical equipment.

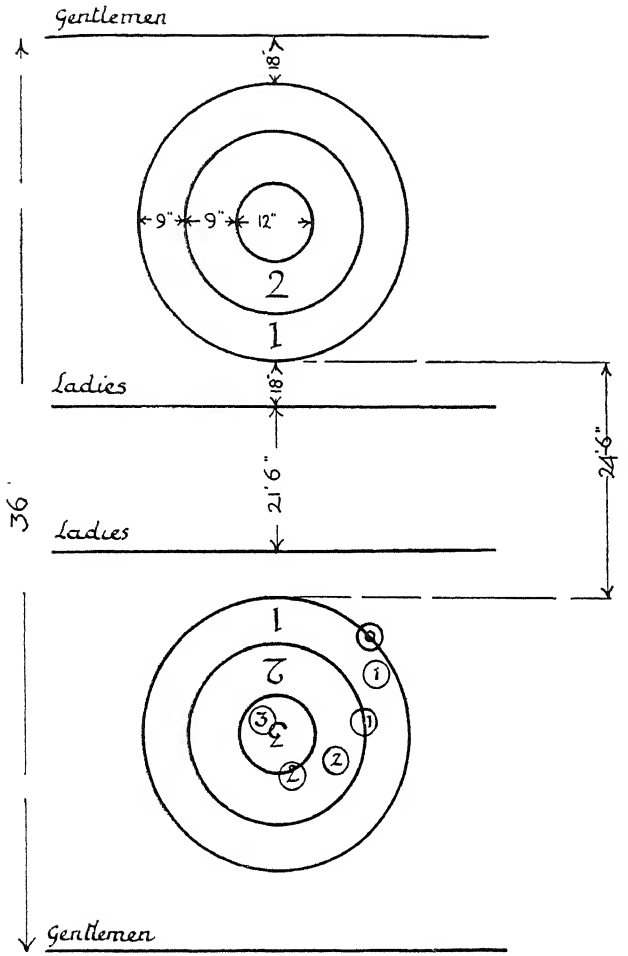
Deck-Tennis (Pacific Practice)

In the Pacific the practice of using a round flat dumpy bag of sand instead of a quoit is general. The dump is made of canvas, sewn so that the seam is turned inwards. It should be partly filled with sand and should then weigh 1 lb. $3\frac{1}{2}$ ounces, and measure 5 inches in diameter.

The rules of this game are the same as the others, but it is both faster and more dangerous. Thumbs and fingers are not infrequently put out of joint in the heat of fast play. But the devotees of the sand-bag are tremendously enthusiastic about the sporting qualities of their game as above the other, and could no more think of using a ring or quoit than a rugger player could a round football.

Deck-Bowls

Some of the largest ships carry a set of shore bowls with them. But on the heaving Atlantic, even on the steadiest vessel the game is naturally more apt to be one of hazard than of skill. Deck-bowls, as properly understood at sea, is played with rope quoits. There are a great many ways of playing this game and again a variety of shades in the rules as practised in different ships. The truth is, this game has a mixed pedigree in which bowls, old English quoits, and Scotch curling are all ancestors. Naturally, family likenesses vary according to the ship's tradition. We can at any rate



DECK-BOWLS RINK
(After Captain Clark)

very conveniently borrow terms from the three great-grandparents and give rules for the best standard mixture as follows.

Two targets are drawn on the deck, as in shuffle-board, one at either end of the rink. The inner circle counts three, but it is clearer not to write the figure on it—merely put a chalk dot in the centre (as in the target in the upper part of the diagram). No actual *jack* is used in this game, but the centre of the inner circle is regarded as the jack.

Four quoits is the allowance for each player, and quoits used for a rink of the above dimensions should measure four and a half inches, outside diameter. The singles game is played by the opponents standing at one end of the rink and playing their quoits towards the far jack, then going to the opposite end and playing them back again. In doubles, partners stand at opposite ends, each side by side with his opponent.

Now the sense of the game is that the numbers in the target circles can only be applied to scoring quoits. The quoit nearest the jack will score, and every other quoit of the same player which is nearer the jack than the best quoit of his opponent. Thus, if Player A has his four quoits all nearer the jack than the best quoit of Player B, he scores with all of them according to the target numbers. If Player A has the nearest quoit to the jack, but the next nearest is one of Player B's, only one quoit scores, namely A's best quoit.

The small circles on the lower target in the diagram emphasize the rule that a quoit touching a circle will score the number of the outer ring.

The quoits must be thrown back-handed in the usual way. As in the proverb, "He laughs best who laughs last," it is to the player's advantage, both in this game and in shuffle-board, to have the second, and not the first, turn.

The Orient Line gives some points and penalties as follows:

(1) Feet must be behind the line.

(2) Players must not stand beyond the right or left ends of the lines to pitch.

(Penalty for breach of 1 or 2 herein: the offending quoit shall be removed and displaced quoits replaced in original positions.)

(3) Quoits falling short or touching the line in front of the target shall be removed before the next quoit is played.

(4) The game shall be 21 points.

A simpler game, more on the principle of shore-bowls, is laid down as follows by the Booth Line.

Quoits are used for the woods, and a wooden disk for the jack. Each player is provided with two quoits. The object, as in bowls, is for each player to get his quoits as near the jack as possible. A player can throw his second quoit to move his first one (or one of his partner's), nearer to the jack, or to knock away his opponent's.

When singles are being played the two nearest quoits to the jack score one point each.

When doubles are played the four nearest score one point each.

The person or side first scoring 21 wins.

No rink is drawn on the deck for this game.

Peg-Quoits

The peg-quoit apparatus is generally found to be in use by two kinds of individual only, the peg-quoit enthusiast and children. But the game should have a much more general application, not as an end in itself, but as a means towards attaining proficiency in the placing of the ring in deck-tennis. The man who puts in conscientious practice on peg-quoits at a longer range than that required for the ordinary game will find his deck-tennis play improved. Single peg is best for this.

The rules for the ordinary game are as follows:

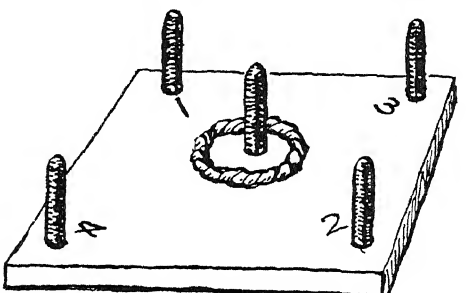
The pitch is generally 9 ft. for men and 6 ft. for ladies.

The single peg counts one point per quoit landed on it.

The full board is generally numbered as per diagram, 1 to 5. The score is according to the numbers on the pegs and the object is to get the biggest number possible, willy-nilly.

The Nippon Yusen Kaisha play on a nine-peg board and apply bull-board methods. I quote their set of rules as follows: "Each player has eight quoits

and must first land a quoit over the peg marked 1, then over 2, and so on up to 9 in consecutive order. Should a player land a quoit over the wrong peg, he must make the former peg once more. Suppose a player lands two or three quoits over the wrong peg, when trying to ring the first one, he has to ring peg No. 1 three or four times. Each player has the same



ORDINARY PEG-QUOITS BOARD

number of turns, and the one who rings the ninth peg first is the winner. If both players ring the final peg in the same number of turns, the one who holds more quoits in hand is the winner. If each has the same number of quoits left, they should use these in trying to ring the pegs in the reverse order, the player ringing the greater number being the winner."

To relish this game one must have the Oriental patience.

Bucket-Quoits

I am indebted to Captain Clark for the following notes on bucket-quoits. The gentlemen's line should

be marked off 16 ft. from the bucket, the ladies' line 10 ft.

A turn consists of throwing six quoits.

Players will have an equal number of turns. In the event of a tie, the game must be continued until a decision is reached on the equal turns basis.

If a player succeeds in throwing all six quoits into the bucket he earns the right to go on throwing and scoring until he makes a miss.

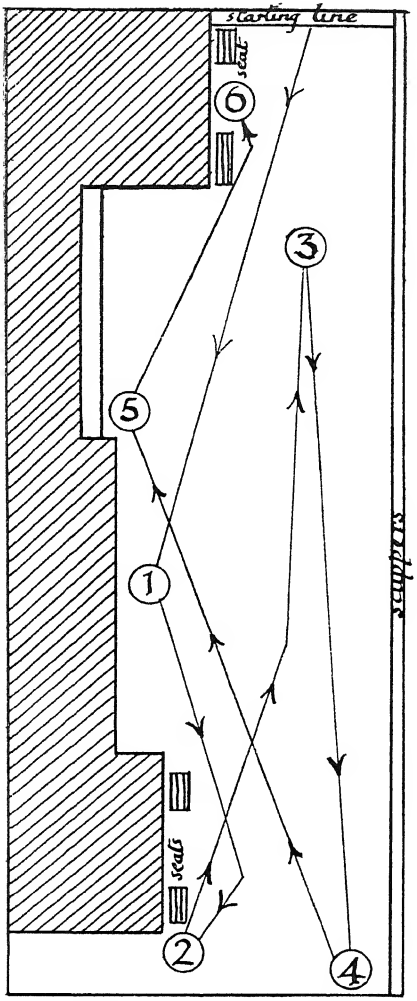
Disk Games

Deck-Golf

Deck-golf is an admirable game. But, unfortunately, it is more popular among passengers than seamen. It need not, if skilfully set out, occupy more precious deck-space than shuffle-board, though it is apt to cause crowds, which interferes with the circulation of deck-walkers. But the sailor likes things symmetrical and shipshape, which a deck-golf course is not. Also he hates to have his paint-work interfered with, and deck-golfers have no conscience about the kind of divots that cannot be replaced. The game flourishes best in a one-class ship. I remember an old cargo-boat, which carried a few passengers, whose captain commanded his ship and also the English language with a sort of efficient urbane ferocity. He embraced deck-golf with the real exclusive spirit of the shore game. When not playing

himself, he kept touch with the passengers who were from the bridge, and even swept the links with binoculars and hurled invectives at bad players through his megaphone. I am sure there was no floating golf-course in all the world to match this one, and voyage after voyage the skipper and his boatswain studied to improve it. Over the long well-decks, fore and aft, there were bridge-like gangways, which, although they required considerable skill in driving to clear in bad weather, enabled one to play all round the ship from poop to forecastle-head port-wise, and from forecastle-head back to poop starboard-wise, a 36-hole course. The ship had originally been equipped with all the usual deck games, but one by one they had disappeared, handed over secretly by the boatswain to Davy Jones at dead of night, one must suppose. At any rate, in my time, the passengers had no option but to join the golf club or keep off the course (the whole available deck-space), and beyond a doubt it was a magnificent club, the like of which will never float again.

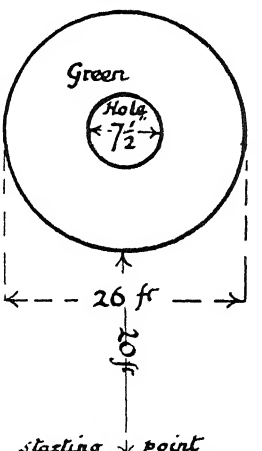
The name deck-golf must be regarded as assumed for the sake of fashion, for its ancestors were croquet and billiards. But having come to bear the name of golf, it is thought essential to provide the course with bunkers. In my opinion the game is much better without them. Bunkers for deck-golf are of two kinds. The first is diagrammatic and consists of hazards, such as rivers, lakes, sand-pits, etc., drawn in chalk on the deck, in which if a disk lights it must



A Compact Deck-Golf Course
(Booth Line)

be taken out and a turn forfeited. The second kind uses tangible objects such as stanchions, ventilator cowls, passengers' feet, etc. A compactum course fairly heavily bunkered after this sort is shown in the diagram. Courses have been devised to take up even less room. But the best fun is to be had where one is allowed plenty of length of deck.

The game is generally played with single circles but an outer circle is sometimes added. The use of the outer circle is to act as a green. It makes a delineating line for the putting rule, i.e. if a disk touches the outer circle the holing-out must be done with knocks of the cue and not pushes. The figure shows dimensions of a green from a sketch after Captain Clark of the *Patroclus*, Blue Funnel Line.



PUTTING GREEN

These dimensions are given for a game in which the disk used is $3\frac{1}{4}$ inches in diameter, but as disks are more often 6 inches or bigger, necessary allowances must be made.

The Nippon Yusen Kaisha have as many as eighteen rules and go in for chalked bunkers which vary in penalty. The Atlantic Transport Co. have a good

game with ten rules, which seems to be sufficient. I append it.

RULES

(1) The opponents shall be the odd against the even numbers.

(2) When driving from the tee, number 1 shall start, to be followed by 2, 3, and 4.

(3) Should any player hit another's disk, he shall be allowed another shot, but should the player touch the same disk twice by direct shots, though not in succession he shall lose one shot.

(4) Scuppering is only allowable twice in succession, after which the player scuppered is allowed a shot when his turn comes. If the disk lies flat in the scupper it must be lifted out on to the first plank. This constitutes a shot equivalent to the loss of a stroke.

(5) No player shall play on to another disk in the scupper when the player's disk is lying flat.

(6) If the disk is not lying flat in the scupper it may be scooped out, such scooping constituting a shot, and in the case of the scooping-out taking place after the second scuppering, the player shall be allowed a shot in play, when his turn comes, before his opponents are allowed to scupper him again.

(7) A disk shall be considered to be within the hole so long as any part of the chalk mark forming the circumference can be fairly seen.[1]

(8) A disk knocked or pushed into a hole by any

[1] The more general rule, however, is that to score, the disk should be clear of the line.

player shall be counted as having made that hole, if such hole is the one that the owner of the disk is due to make next.

(9) After making a hole the player is entitled to play again, and may push or knock at his discretion.

(10) When a disk is touching a bulkhead or any obstruction, the player shall not be allowed to move it before playing, without penalty.

PENALTIES

(1) For playing a push-shot instead of a knock, the player forfeits any further right to play, and shall also put the disk or disks in the same position, as far as possible, in which it or they were when the player made the foul stroke.

(2) For scuppering three times in succession, the foregoing penalty also applies.

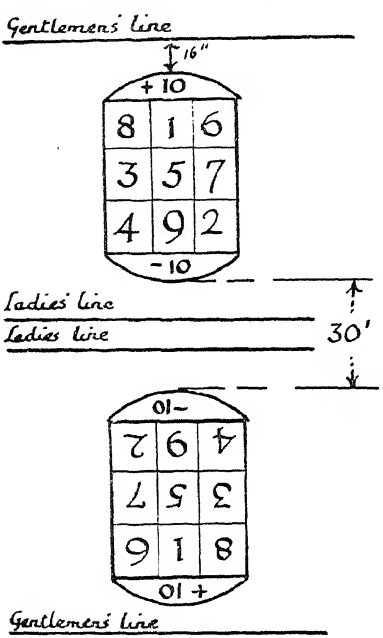
(3) Obstruction disks. Should an opponent impede the flight of any disk the player has the option of replaying the shot. Should the player's partner impede the flight of any disk, the shot may be replayed at the discretion of the opponent only.

Should a spectator impede the flight of any disk, the spectator is to be considered a bunker.

Shuffle-board

This is the veteran of deck games and the purest in origin, having come down to us with rules and name little altered from the old English shove-board

or shovel-penny mentioned in literature as early as the fifteenth century. Under the name of shove-half-penny, it is still played in some of the small inns in country districts in England. The ancient game was played on a table made specially for it, a famous one at Chartley in Staffordshire being as long as 30 feet. This, like the deck game, was played with disks and not coins. I am told that as a shore game it is still played in America, where (as also on American ships) it is called shovel-board. It is a universally popular game at sea, where it is more played than any other.



A SHUFFLE-BOARD RINK

The rules and the lay-out of the game as chalked on the deck do not vary much, though some have a vertical line bisecting the +10 and −10 divisions. The squaring and numbering is a departure from the ancient game. The placing of the figure 9 (just over the water-jump of the −10), and the 1 (where

you may starve if you fall short of the ambitious 10) are good. The others are probably not so well thought out, but meant to stick in the deck artist's mind through the fact that a line of them all tot up to 15, if added lengthwise or crosswise or diagonally.

The dimensions in the diagram are for disks six inches in diameter. The disks of opponents are distinguished by being painted different colours. Red and blue are the best colours, as they are easier to aim at.

In doubles, partners stand at opposite ends, side by side with opponent's partner. Each player has four disks. If A starts, he plays one disk towards the far set of squares. If the disk does not clear the far ladies' line, it must be removed from play. If it reaches the squares but touches one of the chalk lines, it does not score. Then B plays. If A lies on a scoring number clear of a chalk line, B is at liberty to knock him off, if he can. But if A lies in the —10 space, B will probably prefer to "put a guard" on him by throwing his disk so that it will lie just on the near side of A's. Here placed, though not scoring, it will diminish A's chance of knocking his first disk into a better position. If the players are good, however, this is a doubtful practice as, if B's guard is hit true, it will probably hit A's —10 away and take its place.

When A and B have played alternately till the eight discs have been all dispatched, the other end plays them back again. It is generally the rule, that the side which scores lowest in one over plays first in the

next, and in this game it is the second player who has the advantage, for he will get in the last shot.

Old hands have fixed ideas about the order in which they intend to score their numbers, some aiming to get the 10 and put a guard on it by sitting on the 5 or the 9, others insisting that 8 or 6 are the best to make for first. The game is at its best when the ship has an easy roll, as with skill and practice it is then possible to put a screw on the disks and reach good sheltered positions beyond disks already placed.

The game is usually 50 or 100 up.

The length of pitch varies from 25 feet to 40 feet (French Line).

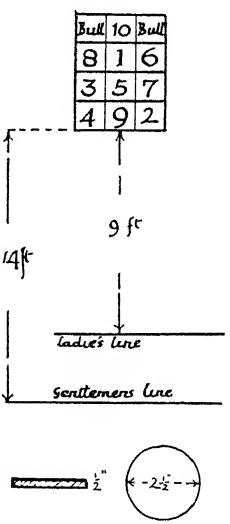
Captain Clark gives the dimensions of a well-tried rink as follows. Extreme length between gentlemen's lines, 32 feet. Inside length, between ladies' lines, 14 feet 6 inches. The target is 16 inches clear of the line above and below it. The plus and minus spaces are 12 inches deep, and the squares are 12 inches square. The disks for play on this rink should be $3\frac{1}{4}$ inches in diameter by $\frac{3}{4}$ inch thick.

A variation of the usual play of shuffle-board is to borrow from curling and be "skipped." In this play, you do not use your own judgment as to where you will try and place your disk, but place yourself unreservedly in the hands of your partner for direction, and let him captain or "skip" you. The points of this method are, that it lends you great moral support to have a definite aim, and that if you make a good try for what has been ordered, there is considerable

satisfaction to be had out of it even when the shot does not quite come off. The skipper skips by placing the end of his cue on the spot he wants you to come to or by tapping a disk if he wants it moved on. If he wants you to touch it just on one side, and he is a Scot, he will say, "Crack an egg here, partner!"

Bull-Board

This is a game which always goes to sea, is always put out, and seldom used. But it has its votaries and you will not find it an easy matter to beat one, if you are new to the game. The playing pieces are either rubber disks or canvas dumps filled with sand. Even in this simple game the rules conflict, so I am tempted to give three sets in case one of my readers finds himself confronted by an old player, who is a stickler for the "correct" thing.



BULL-BOARD PITCH AND RUBBER PLAYING DISKS
(After Captain Clark)

Booth Line. Each person is supplied with six dumps. Standing behind the starting-line, he tries to throw them on to the squares in the following order:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Right-hand bull.

Left-hand bull. Left-hand bull again, right-hand bull, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1.

When a player has thrown his six dumps, the square he has reached in proper order is noted, and the next player throws his six dumps, and so on. When each person has thrown his six dumps, the first thrower plays again. To win a square, the dump must lie completely in it, and must not touch any of the lines forming the square. If it touches a line, it does not count. A player, however, can throw one of his other dumps to move it into the square to score.

If a player throws or moves a ball on to either of the bull squares out of its proper order, he has to commence at 1 again. The player or side first completing the whole sequence wins.

If a ball misses the board, or having hit it falls off, the player goes back one number.

Blue Funnel Line differs in almost every respect.

The order of the squares is 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Right bull, left bull, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1.

If, when trying for a number, the disk falls on either the right or left bull, the player must go back and score his last number again. (This rule applies when either bull is being tried for, and the disk falls on the wrong bull).

Only the disk in play counts for scoring. Any disk which is at rest, which is moved on to the square being played for, does not score.

If the player who began reaches the final No. 1

and there is a possibility of his opponent also doing so, he shall complete his turn, if he has any disks in hand (going on to 2, 3, etc.). His opponent shall then have one more complete turn.

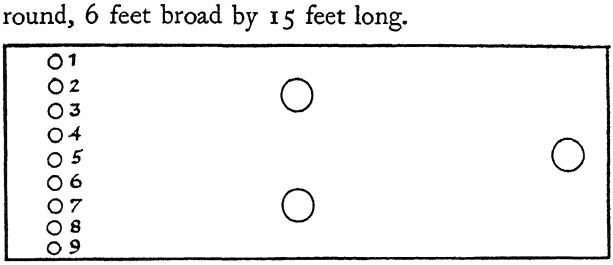
The Royal Mail Line play the former of these two sets of rules, but have a board marked in tens instead of units.

Ball Games

For descriptions of the following three games I am indebted to M. Jean Henry, purser of the *Isle de France*, French Line.

Miniature Deck-Golf

The game consists of a rectangular figure screened round, 6 feet broad by 15 feet long.



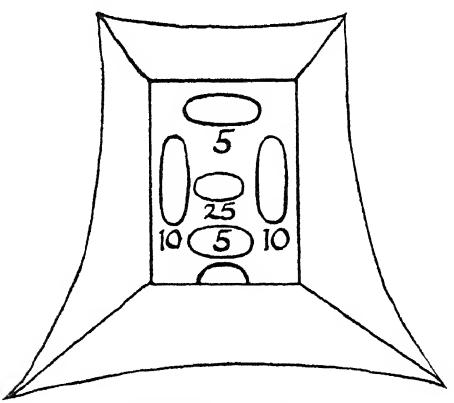
Miniature Golf Course

At one end of the links nine numbers are marked off. In the centre, two small cylinders of white-wood are placed and a space is left between them of $3\frac{1}{2}$ inches —or wider for beginners. A third wooden cylinder is placed at the far end. An ordinary golf-club and ball are used.

The idea of the game is that there are nine different tees instead of nine different holes. You begin playing from tee No. 1, you must go between the two wooden cylinders half-way down the course, and you hole-out by hitting the wooden cylinder at the far end.

Chip-Shot

The same screened court is used for this game without cylinders and chalked tees. A canvas screen is



CHIP-SHOT TARGET

set up at the far end, marked as shown, with figures corresponding to holes cut in the canvas. The holes lead into one large pocket at the back so that whichever one the golf-ball enters, it is returned by gravity through the bottom unmarked hole. The tee is placed at 12 feet from the screen, and the object of the game is to hit up to an agreed-on number—say 100.

M. Henry declares that this game is very popular —with golfers.

Bumble-Puppy or Spiro Pole

This is a kind of captive tennis, and under the first name given was played frequently behind the lines during the war. It can be played solo or by two people.

As played on the *Isle de France* the ball, held in a small string net, is attached to a cord 5 feet 6 inches long which is fastened to the top of a pole 7 feet 6 inches high. Six feet from the foot of the pole, on either side, a chalk line is drawn on the deck. Players must not step inside of this.

Ordinary tennis-rackets are used. The solo game is simply practice to keep the ball from wrapping itself up to the pole. In singles, the object of each player is to be the first to make the ball-tether wrap, so that the ball is stopped against the pole. There is a mark placed 3 feet from the top of the pole. To score, the tether must be completely wrapped round the pole and above the mark.

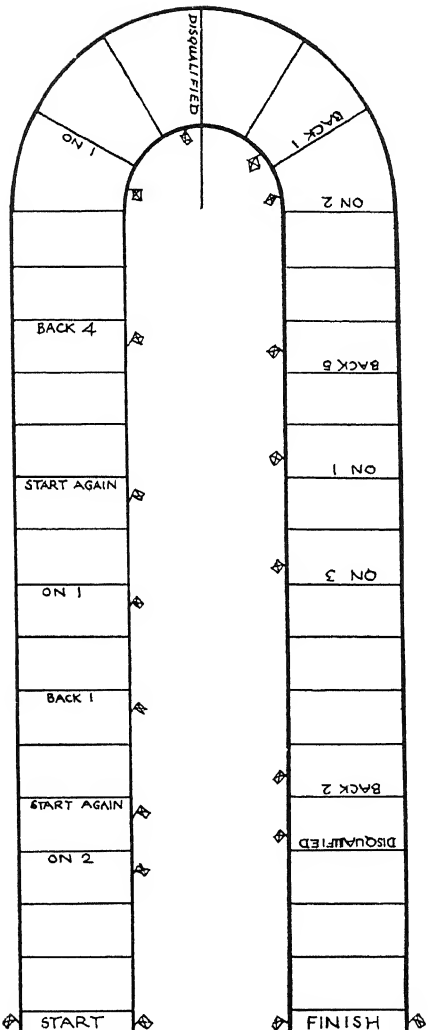
Race Games

The Horse-Race

Race games are generally played on deck with the courses marked out in chalk as for other games. But some ships carry portable courses painted on canvas,

which can be laid down like a carpet in the ball-room or elsewhere, and rolled up again. The following account and diagram are from the Royal Mail Line.

"Played in the same manner as *Minoru*. The scoring is done by means of two dice-boxes, each containing two ordinary dice. There are six horses in the field, and one passenger throws the number of the horse to be moved, whilst the other throws the number of squares it is to jump. It has been found that it adds great interest if people are given opportunities to have a mild gamble on their 'fancy,' and the best way of working this is for each horse, which is of course numbered, to have its own betting-booth. The betting is on the Pari Mutuel system and the usual way is as follows: Each table, that is, each horse, is supplied with 500 tickets marked with consecutive numbers and sold at a shilling each. On the ringing of a bell the betting-booths are opened. On the ringing of the second bell all betting ceases, and the Banker or Bankers (two are better than one) go to each table and ascertain the number of tickets sold to each horse. On the ringing of the third bell the race starts, during which the banker works out the various odds, so that immediately on the termination of the race winning tickets can be paid out whilst the betting is taking place for the ensuing race. It has been found from experience that four or five races are sufficient for one meeting."

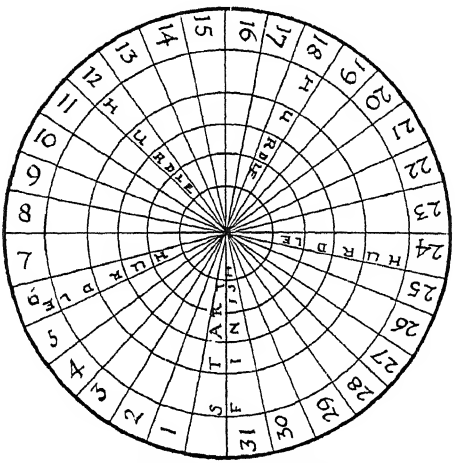


RACE COURSE
(Royal Mail Line)

THE DOG-RACE

Greyhound-Racing

Dog-racing on board has two points in common with the practice ashore. It takes up less room than horse-racing and is not such a fashionable parade as the sport of kings.



GREYHOUND TRACK (After Captain Clark)

The game is played with six dogs and two dice. The six dogs are numbered 1 to 6, one dog for each track.

The number turning up on the first die thrown represents the dog which is to move. The second die is then thrown and the number turning up indicates the number of spaces the dog is to be moved on the track.

Hurdling. In hurdle races track sections numbered 6, 12, 18, 24 are hurdles. If the number thrown falls on a hurdle, the dog misses his turn. There is a flying finish.

Flat Racing. The exact number to finish must be thrown.

CHAPTER XV

THE SEA TOURIST

TOURISM—with acknowledgments to the French for having given us a word we ought to have made for ourselves—tourism is built on romance, and hopelessly pledged to it. If an English railway company wants to sell tickets to Cornwall, it plasters the hoardings with pictures of pirates, wreckers, smugglers, and galleons. People do not really expect to see these things at the journey's end, but a kind of expressionless hope is born in them that something of the old flavour must survive. According to the poster we are led to believe that the steeple hat and red cloak are still worn in Wales, the kilt in Scotland, and the shillelagh brandished in Ireland. In fact this forceful labouring of palpable untruths goes on in the advertisements of all land transport. The policy was started when the public was comparatively green, and the advertisers have not yet discovered that it is becoming educated.

The shipping companies have a different policy. They do not stress the romantic note enough, in fact they harp on it very little. If they do so, they follow the time-honoured lies, when they could tell amazing

truths—for neither the antiquity nor the romance of the sea has been tampered with. Byron's lines still hold good:

> Man marks the earth with ruin—his control
> Stops with the shore;—upon the watery plain
> The wrecks are all thy deed, nor doth remain
> A shadow of man's ravage, save his own.

Comfort is the key-note of sea-transport advertisements. And in this respect they are the most truthful of advertisers, for it is part of their policy to give their customers what they promise. If you go first class on an up-to-date ship you will probably get more attention and genuine consideration than you could buy from any institution in the world for any money. The shipping companies believe that this is the only way of keeping their ships filled. But both from an advertising point of view and a personal one, I venture to think that they are carrying this policy too far. They have got it fixed in their minds that the only way to lure a man on to the ocean is to give him afloat everything except terra firma that he gets ashore. They have followed up the floating-hotel ideal. Incidentally they have arrived at something much better than, but quite different from, a floating hotel. It is the difference they ought to boast of, and not the supposed similarity. They are not content with their achievement. They make another and stronger bid for carrying shore feeling out of sight of land, and court the furniture vogue.

Up till the time of the war all ships followed a

certain tradition conservatively in decoration and fittings, a tradition that may have begun as early as Henry VII, but which was certainly firmly established by the fleet of William of Orange, the classic style, reintroduced into the world by the enthusiasts of the Renaissance. For some reason—possibly because of the formality of it—this style was eminently suitable to the sea, though it hardly ever suited the land. It was transferred successfully and naturally from the sailing-ship to the steamer and continued to to flourish until the great break came when the shipowner allowed the furniture maker to introduce crazy fashion into the stately hulls of liners. Now we go to sea with the turbine, the dynamo, and the wireless-set and are pressed to feel Jacobean, Elizabethan, and generally "Old English." The sea cannot be pleased with these shams, and I doubt profoundly if the passengers are.

One of the latest ships, the *Carnarvon Castle*, Union Castle Line, has not heeded this trend because, owing to her connection with South Africa, she is fitted in the Dutch style, which is classic and is therefore in keeping with the old tradition, and it is a distinct relief to go on board her after a visit to one of the "Old English" Western Ocean boats. The Canadian Pacific have done much better. They have broken with the old tradition but have done so legitimately. Their four new *Duchesses, of York, of Atholl, of Richmond*, and *of Bedford* are fitted after a rational modern George the Fifth style that has evolved ashore

without a jolt, through Regency, Victorian, and Edwardian epochs. They are on the right track.

Tourism is becoming the leading trade of the sea, and tourism is not what it was. It is getting highly intelligent. It is getting past being tempted by such a materialistic and fatuous lure as a floating hotel, and surely too well educated to revel in spurious old oak fastened on to iron beams.

I believe thoroughly that nothing would pay the shippers so well as to base their ideas and their publicity on the sea itself, to build their ships to look like ships, within as well as without, and while not sacrificing any of that wonderful organization for keeping the passengers tenderly cared for, to develop wholeheartedly the interest of the voyage *as* a voyage, a sea-experience, fraught with the tonic contrast of complete change of environment, rather than continue to extenuate the absurd make-believe that the sea is the land. If not, the rebellion will come from the public itself—possibly from the democratic, free-thinking new class called Tourist-third, and they are the coming ocean freight.

"Make your ships shippy!" would be my slogan—almost as shippy as yachts—then you will recapture the spirit of Homer, and Romance and Travel will have a real chance to go hand in hand again.

Now, what is a sea voyage, and what can be made of it? It is a journey in a kind of box with an unknown jumble of one's fellow-creatures who begin to react on each other immediately the journey starts,

and tend to form a kind of pattern of coherent design on the last day of the voyage which, if examined in detail would provide material for a library of novels. This jumble of people will continue to journey in the box for many days, with feasting, and song, and dancing, but without knowing precisely where they are. Few of these people understand anything of the works of the box or the labours of those who work it, while the journey is made through and upon the two great elements over which man has no power. In fine, every voyage is a new and incalculable adventure. And what can be made of it?

The only people who can work at sea are the people who work the ship, and they work with a vengeance. The routine mapped out for, and expected of, all good passengers, is to eat, drink, read, and play games. There is another unscheduled occupation, namely to enjoy the voyage for its own sake. The ship herself, her departments, works, navigation, fittings, her personnel, her personality, all teem with interest. The sea itself, the veil of whose mysteries has not even yet been lifted a tithe as much as those shrouding the mysteries of Babylon and ancient Egypt, has possibilities of enchantment for the layman, yet unrealized except by men of science. I can foresee the time when the keen tourist will take a "Popular Oceanology Outfit" with him comprising filters for fixing to the salt-water tap in the bath-room, to collect marine plankton, and a magnifier for examining these amazing creatures, which are both

plant and animal. Such a philosophy naturally does not occur to passengers schooled in the hotel and old English ideas. When shipping companies cater for ship and voyage interest, meals will be arranged so that no sunset will be missed, and the decks and not the dining- and smoking-rooms will be crowded at that hour. Community sunset-seeing might prove more impressive than community singing. There would at any rate be no question about the high artistic quality of the performance; and the crowd psychology of the assembled watchers (if they kept their mouths shut) should give that curious stimulus to individual feelings which renders suddenly sensitive the impressional mechanism, and makes it register the mysticism of the moment.

The Land Tourist is only just beginning to be conscious that he is an evolving type, crude at present, but expected eventually to soar above the level of herd sight-seeing, and to enjoy things for their own sakes, and not for their guide-book appraisal. But the Sea Tourist is hardly spoken of yet.

GLOSSARY AND INDEX

GLOSSARY AND INDEX

A.B. seaman, 75
Abaft, 16
Adder, ss., 9
Admiralty, attitude towards early steam, 7, 8, 10
Aft, 16
Albatross, 149
Alleyway, a passage of any kind conducting from one part of a ship to another.
Amiens Cathedral, 16
Anchor, patent, bower, sheet, stream, sea, 25, 26
Anderson, Sir Alan, 81
Avast, 'vast, stop; "Vast heaving there!" Stop heaving

Backstay, 25
Ballast, in, 21
Beacons, wireless, 95
Beam, 17
Bearing, true, points invariably to the North Pole. A magnetic bearing points to the magnetic pole and varies from locality to locality, 39
Belay, to make a rope fast by jamming it in a cleat or belaying-pin
Bell, Henry, 8
Bend, to fasten. Sails and anchors are *bent* on to their spars and cables respectively; to bend a bow was originally to fasten the string of it; the present shore use of the word "bend" is really a simile of the shape of the bow after the string has been *bent* on to it; "a band" and "to bind" are cognate words
Berth, a bed on board ship; also the place where a ship lies when she is alongside a wharf; an extension of this idea, of an occupation of water or sea-room, is that of giving a ship or a rock a "wide berth"; the *O. E. Dictionary* has nothing satisfactory to say about the derivation of this word, it traces it doubtfully from the verb *to bear*. Elsewhere a French or Norman origin from *berceau*, a cradle, has been suggested. The latter is an excellent idea and apt

Bight, a slack or loop of rope
Bilge, 19.
Bilge, keel, 19, 20
Binnacle, 34, 35, 37
Birds, 147–50
Board of Trade. The British Board of Trade is a Government department chiefly concerned with safety at sea. The survey of ships is in its hands, also the examination of officers for "tickets" of competency in seamanship. Recently the coast-guard service has come under the B.O.T.
Boatswain, 73
Boilers, donkey, 50
Bollard, 14
Boom, 25
Boulton and Watt, 7
Bow, 16
Breadth, *moulded*, the greatest breadth measured from outside to outside of the frames; *extreme* breadth is measured to the outside skin of the hull
Breaker, 171
Brunel, 10
Bulkhead, 20
Bumboat, a shore boat whose owner is in the nature of a hawker and comes off with fruit or wares to sell to a ship's company and passengers. The word is in polite use. Its derivation, which is not polite, may be inferred from the account of it in the *O. E. Dictionary*
Bunk, a ship's bed. A passenger sleeps in his berth, a sailor in his bunk. Sea tradition dictates that you should lie with your head towards the bows
Bunker (noun and verb). The use has been extended from coal to oil. For taking in coal the expression is generally "To coal," for oil the parallel has an obvious objection so the expression is "To bunker oil"
Buoys, can, nun or conical, middle ground, 92, 93
By, conserves old adverbial use, what is now *at* night was formerly *by* night. *By* the mark! Down *by* the head; Full and by

Cabin class, 180
Cabins, inside, outside, Bibby, 27, 28
Cable, the anchor chain. It formerly signified a strong rope. The word is now enlarged to mean a submarine electric conductor and an anchor chain (p. 25). The deck sailor laments:
"On six days of the week

Cable—*continued*
thou shalt labour and do all that thou art able,
On the seventh thou shalt holy-stone the decks and scrape the cable."
Calorifiers, 55
Cape pigeons, 149
Capstan, a winding-gear which revolves in the horizontal plane. Formerly it was worked by man-power, the jolly tars pushing it round with hand-spikes called capstan-bars, often to the tune of a fiddler sitting on the capstan-top. Now it is worked either by steam, compressed air, or electricity, 14. *See also* Windlass
Captain, 70–72
Capto, 97
Carpenter, 75
Carry away, the best paraphrase of this is the slang verb *bust*. Used in the transitive sense it generally implies separation. For instance, you might bust a leg and have it, but to *carry away* a leg would imply amputation
Carry on, came ashore with a vengeance in 1914 and no doubt contributed largely to victory in the German war. It is exclusively a sea phrase. It infected the army from the troop-ship, as did many other sea terms which have remained with the regulars but failed to propagate in Kitchener's army
Charlotte Dundas, s.s., 7
Chock, generally a piece of wood used as a wedge to stop the movement of anything on deck when the ship is in a seaway. Such are the chocks which wedge the life-boats from underneath. The word is first-cousin to *choke*, and the connection can easily be seen. *Rolling chock*, extra bilge keel or fin fitted to ship's side to damp out rolling.
Chronometer, clock specially made to keep time with minimum of error under all conditions. It is set to Greenwich time and is used as a basis of calculation in reckoning the ship's position. The wireless time-signal has to some extent superseded the chronometer as a paramount instrument
Clermont, s.s., 8
Clouds, 156
Coast-guard, 86
Companion, first meant a store-room, then the roof of a covered stair, finally

Companion—*continued*
a ship's staircase. This interesting old word is still alive even in big ships, but is in danger of becoming extinct through hotelism, 29
Compass, magnetic, 36; dry-card, dead-beat, 38; gyrostatic, 38–40
Compound engine, 12
Condenser, surface, 52
Cylinders, names of, 13

Davits, 22, 23
Dead reckoning, 41
Deadweight, 59
Deck, 21, 22
Deck games: tennis, 190; bowls, 194; peg-quoits, 198; bucket-quoits, 199; shuffle-board, 205; bull-board, 209, deck-golf, 200; miniature deck-golf, 211; chip-shot, 212; bumble-puppy on spiropole, 213; horse-racing, 213; greyhound-racing, 216
Depth, *moulded*, is from top of keel to top of upper-deck beam at gunnel, measured amidships
Depth-marks, 17, 18
Derrick, 25
Direction-finder, 96
Displacement and displacement tonnage, 58
Dolphin, 139
Draft, 18. Draft describes the depth of the submerged part of the hull only; all above the water-line is called *freeboard*
Dumb barges, those that have no means of propulsion, and are only towed

Echo-sounder, 44
Engineers, and sailors: difference between, 79; rise from obscurity of, 80
Engines, marine, 6, 12, 48, 52
Ensigns, the three, 162

Fata Morgana, 155
Feathering paddle, 5
Fiddles, wooden frames made to fit round the edges of the dining-tables; used during bad weather to prevent the crockery from slipping off on to the deck
Fiddley, open space from uppermost deck down to stoke-hole. It is a means of escape for the stokers in an emergency
Fitch, 7
Flags, 159
Flinder's Bar, 37
Flying-fish, 141
Fog-signals, 88
Forecastle, 163
Foremast, 24
Fore-part, 17
Forestay, 25
Forward, 16

Frames, longitudinal and transverse, 20
Fulmar, 149
Fulton, 7

Galley, ship with oars, 3
Galley, the ship's kitchen, 29
Garboard strakes, 19
Gear reduction, 53
Gear, standing, running, 25
Gimbals (the *g* is pronounced soft), 35
Glory-hole, the stewards' sleeping-quarters. The glory-hole is the descendant of the *cock-pit* and is said to owe its peculiar name to the death of Nelson, which took place in the cock-pit of the *Victory*
Godown, an Anglo-Indian term for a warehouse
Great Britain, s.s., 10
Great Eastern, s.s., 20

Hawse-pipe (pronounced horse-pipe, from "hawser," a rope), 25
Hobart machine, a kind of mechanical scullion that has moving parts on which attachments such as an egg-beater can be fixed. It is credited with power to perform over a hundred operations
Hotelism, is a strange craze which tends to oust all nautical ways and words from ships which carry passengers. The germ first appeared on the North Atlantic ferry. It is a true paradox, as the instigators of the "floating-hotel" and "you'd-never-know-you-were'nt-in-a-hotel" ideals, were people who venerated the antique, fostered folk-lore, collected old furniture, grovelled before the cult of morris dancing, and brought out costly editions of the printable parts of sea chanties. People suffering from hotelism do not respect any survival until it is dead, and coterie artificial respiration can be applied

Jet propulsion, 4

Keel, 19
Kelvin, Lord, 38, 39, 44
Knee, 20
Knot, 42, 67

Ladder, *accommodation-ladder*; demountable staircase let down over the side from the deck of a ship to admit passengers on board when the ship is lying off. *Jacob's ladder*, a rope ladder with wooden rungs. The pilot generally comes on board by this means

Landfall, sight of land. You do not sight a landfall, you make it
Lead, heaving the, 43
Lee and leeward (looard), 15
Leech of sail, 15
Leeway, drifting to leeward, 19
Length O.A. (over all). The greatest length between extremities. *Length B.P.* (between perpendiculars), measurement from forward side of stem-post to after-side of stern-post. There is also *length on water-line*, which explains itself
Life-boat, ship's, 22, 171
Life-buoy, 174
Lighthouses, 87, 100
List, when the ship rides with one side lower in the water than the other. The ship is *trimmed*, i.e. set right, by moving fuel, water ballast, or even cargo till she rides on an even keel
Load-line or load water-line, 17, 18
Log, 40
Lubber-line, 35
Luff of sail, 15

Main discharge, 52
Make, to. In sea language the sense is generally to arrive. You make port and you make the land
Mariner's birds, 148
Mast, 24. *Pole-mast*, a mast made in one piece from foot to truck
Mauretania, s.s., 22
Milky Sea or White Water, a condition of sea phosphorescence, 152
Miller, Patrick, 5
Molly mawk, 149
Monaco, the Prince of, 146
Montclare, s.s., 98

Nautical mile, 42, 67
Nave, 16
Nelson, Lord, 8
Nelson Line, 188
Noctiluca, 152

Paddle-steamer, 5, 9
Peak; top end of the gaff. Also compartment for holding water-ballast in fore-part and after-part of a steamer—fore-peak and after-peak, 163
Perches, 92
Petrels, 149–50
Phosphorescence, 151–4
Plimsoll, Samuel, 17
Plimsoll line, 17, 18
Plummet, 44
Poop, the region over the stern. Generally in use only in sailing-ships, 16, 163
Porpoise, 138–9, 145

Port (harbour and opening), establishment of. If conditions were as perfect as the oceanographers would wish, that is if we had no land at all, high tide would take place immediately after the moon's transit of the local meridian. As it is, the land interferes. And the average value of the time interval between the moon's transit and high tide is called establishment of the port
Port, the vessel's left-hand side, 15
Propeller, screw, 10

Quarter, 17
Quartermaster, 75

Rennie, 9
Rigging, standing; running. *See* Gear, standing and running, 25

Sachen, s.s., 98
Safety-valve, key of, 82
Sail-maker, 76
St. Elmo's Fire, 153
Scuppers, sunk channel round the edge of the deck to drain away any water that comes on board
Sea-cook, p. 75
Seaway, "Movement in a Seaway" is the correct way of describing the motion responsible for *mal de mer*. The action of waves on the hull causes four principal movements called *pitching* (tipping end-ways), *rolling* (tipping sideways), *sink*, and *shot up*, the general vertical movement down and up
Shark, 142
Shearwater, 150
Ship, 2; power and sail, 3; Vikings, 3; capstan-ship, 6; ship's gender, 11; ship as representing a world, 221
Ships, as in words such as athwartships, is the remains of the old English genetive *es* and means athwart of ship
Shroud, 25
Skin, 17
Skipper, 71, 185
Sounding, gears, 43–6
Starboard, the vessel's right-hand side, 17
Steamer, the first, 5
Steerage, 27
Stern, 16
Stock of anchor, 25
Stokehold, 49
Storms, 157
Studding-sails (pronounced *stun suls*), supplementary sails set on stun-sail booms projecting from the ends of the yards of square-riggers, 5

Stuffing-box, 54
Submarine signals, 89
Symington, 6

Tables: heights, nautical distances, knots per hour, etc., 65, 66, 67
Tachometer, 43
Taffrail, that part of the rail which goes round the stern of a vessel
Telegraph, engine-room, 32
Tips, 183
Titanic, s.s., 22
Tonnage: gross; registered; deadweight; displacement; yacht; Thames
Tons, register; gross, displacement; yacht, Thames 56
Tourist-third class, 179
Trinity House, 90
Triple-expansion engine, 12
Truck, the highest point of the mast
Tunnel, 54
Turbine engine, 5, 52

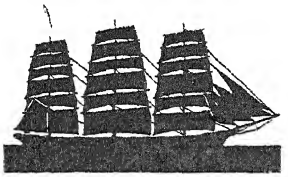
Union Castle Line, 219

Valve-gear, 50
Ventilation, 30

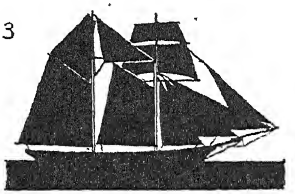
Watches, 73
Water-plane, cubic area of pull below water-line
Waterspout, 157
Water tube, 50
Watt, James, 6
Weather side, 15
Whale bird, 149
Whales, 140
Wind-dogs or Wind-galls, fragments of rainbow seen on detached clouds. They are said to be a sign of increase of wind or approaching rain.
Windlass, a winding-gear in the vertical plane. Windlasses are used ashore for many things. But as a rule there is only one important one on a ship, the windlass for heaving up the anchor. *See also* Capstan
Wireless: direction-finder, beacon, 96

Zenith, a spot in the blue, exactly overhead

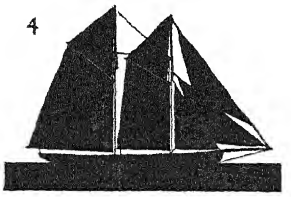
MADE AT THE TEMPLE PRESS LETCHWORTH IN GREAT BRITAIN

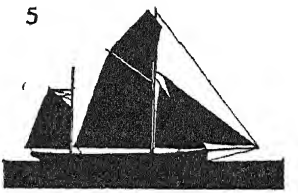


1. FULL-RIGGED SHIP 2 FOUR-MASTED BARQUE. *These ships are on the starboard tack but, for clearness, headsails are shown overlapping canvas on foremast.*



3 TOPSAIL SCHOONER

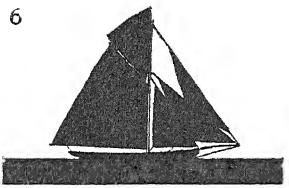




4. FORE-AND-AFT SCHOONER 5. KETCH.

The full-rigged ship is practically extinct. There are still a good many barques on the Western Ocean chiefly hailing from Scandinavian ports, notably Denmark. The schooner is the commonest of the sailing-ship types still surviving. The cutter and ketch rigs are the usual ones for fishing boats.

6



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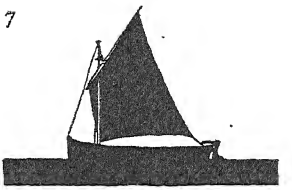
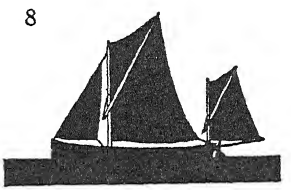


6. CUTTER. 7. LUGSAIL. *A rig in use since the dawn of history Still popular with the Brittany fishermen.*

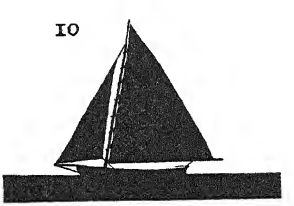
8



8. SPRITSAIL. *This rig does away with separate boom and gaff. One spar serves both purposes.*

9

10



9. LATEEN SAIL *This rig shares the honours of seniority with the lugsail. Until the eighteenth century it figured on the mizen mast of large square-rigged vessels.* 10. BERMUDA RIG *In use only for yachts. It combines mainsail and topsail.*